General Description Of

The Apparatus And Process

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GENERAL DESCRIPTION OF THE APPARATUS AND PROCESS FOR MOVEABLE-TYPE PRINTING.

CHAPTER I.

IN bringing forward a work of this nature, to which the amateur and the inexperienced may alike have recourse for instruction, and to which even the adept may occasionally find it desirable to refer, it will be necessary to describe every subject, however minute in itself, or remotely connected with the Art of Printing. Those who may be disinclined to peruse some of the subjects here treated of, as considering them but of little moment, will therefore, it is hoped, have the candour likewise to consider that such may, to others, appear of the first importance; and afford information, of which, had it not been here given, they might have remained totally ignorant. Without farther preamble, I shall therefore begin with describing the materials and process of printing in a general manner; deferring, to a subsequent part of the work, a more technical exposition of the Art.

The expression "moveable-type printing" implies that each letter, with some few exceptions, used in this kind of printing, is cast upon a separate stalk, shank, or body. A great many of each of the letters of the alphabet, together with points, figures, and other necessary marks and signs, all cast in certain proportions to each other, with regard to quantities, is called *a fount*. When a printer receives a fount from the type-founder, he proceeds to dispose of it, or a part thereof, into a pair of composing cases for the Roman, and a pair for the Italic, increasing the number of pairs of either according to the weight of the fount, and the number of hands intended to be employed on it: usually, for a 1000 lbs. weight, six pairs of Roman and two of Italic are deemed sufficient.

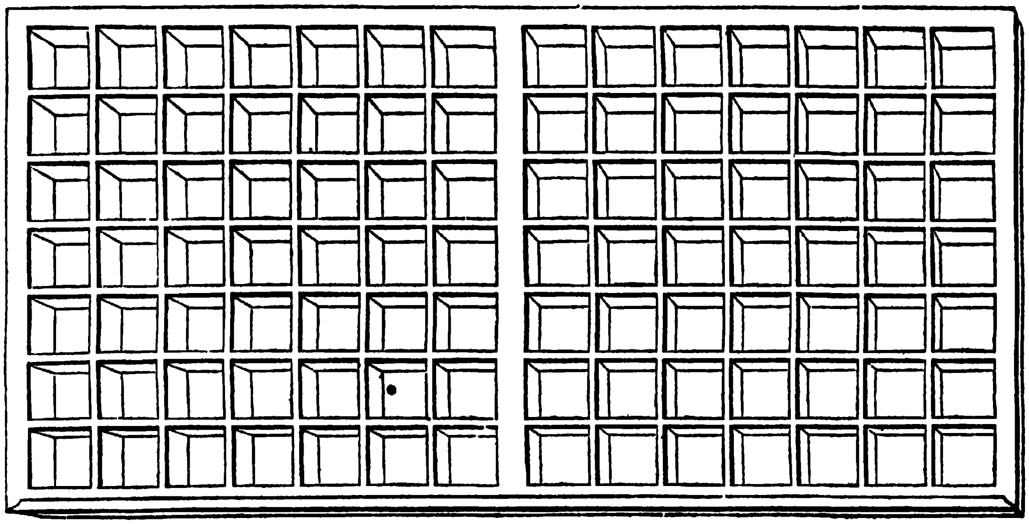
The workmen employed in the Art of Printing are denominated, according to the particular department they fill, COMPOSITORS and PRESSMEN. The Compositors are those whose business it is to arrange and dispose the types, or letters, into words, lines, sentences, pages, and sheets, agreeable to the copy furnished by the author or editor. The Pressmen, strictly speaking, are the printers, as they take off the impressions on the paper, after the types have been arranged by the Compositor. We shall, however, here take them in due order of precedence, and first describe the materials necessary for a Compositor.

THE CASES.

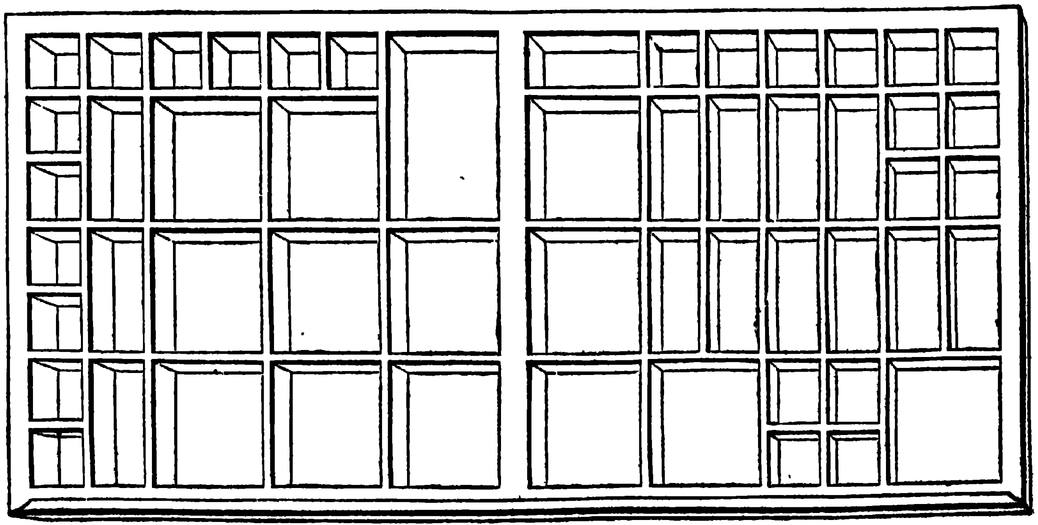
The Upper Case is divided into forty-nine partitions, all equal in size, and which are adapted to receive those parts of the fount least in use, namely, two alphabets of the capital letters, denominated, the one "full" and the other "small" capitals: also the figures, accented letters, characters used as references to notes, &c. The letters and figures in this case are disposed alphabetically and numerically.

The Lower Case is appropriated to the small letters, double letters, points, some other marks used in printing, the spaces, and the quadrats. The boxes or partitions in this case are not, as in that above described, in any regular alphabetical arrangement, nor divided into cells of equal size: but they are in such approximation as to be most convenient to the hand of the compositor. Each sort of letter has a larger or smaller box allotted to it according as it is known to be more or less frequently wanted in the language for which it is intended. Thus, the e has the largest box; the a, c, d, h, i, m, n, o, r, s, t, u, the spaces, and the quadrats, boxes of the next size; b, f, g, k, l, p, v, w, y, boxes half the size of those used for the last-mentioned sorts; while j, q, x, z, ; : . () [] æ, œ, &, double letters, &c. &c. have only partitions of a quarter of the size allowed them. But a more particular description, with the several admeasurements, will be given in the next chapter. As there is no visible mark or guide attached to the different boxes to denote the letters which they severally contain, a stranger to the art is surprised at the dexterity manifested by the compositor in taking out the letters as he wants them from the different compartments.

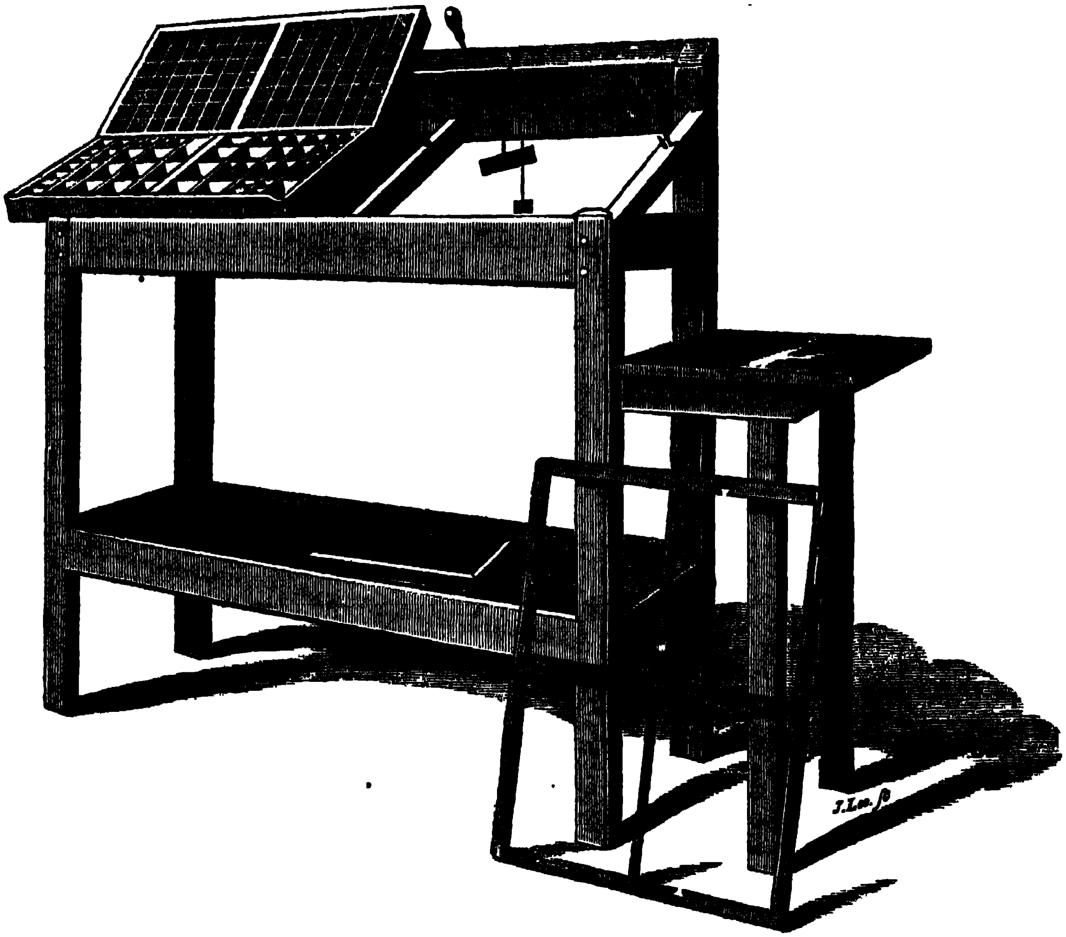
Upper Case.



Lower Case.



THE FRAME, &c.



Before the compositor begins his operations the cases are "put up" on a stand, or "frame," constructed of sufficient length to hold two pair; namely, one pair of Roman and one pair of Italic. The arrangement of these frames in the Composing-room is always so ordered that the compositor may be as near to the window as possible, with the light coming from his left so that no shadow can be given by the motion of his right hand to intercept the quick glance with which he must catch the position in which the next type he has to lift may be lying in its cell; for he must instantaneously view the nick and the head, as no time is allowed for hesitation, examination, or turning, after the first dart is made at the letter; but it is at once lodged upon his setting rule, and then finally secured and dropped into its place by the action of the left thumb alone, his eye being, at the same moment, turned to look for the next letter to be conveyed, in like manner to follow its predecessor. The Roman cases are, therefore, always inside the frame, or nearest the light; while the Italic, as being, in modern works, of less frequent occurrence, as also to accommodate the other Compositors using that fount, lie on the outside. The cases, it may be observed, rest upon the stand in a sloping position; the lower case at an inclination of about fifteen degrees, the upper at an elevation of about fifty-five; so that the compositor may reach the upper boxes with the greatest facility, and with as little danger as possible of putting his lower case in confusion, or *pie*, by the action of his arm when reaching over it.

The engraving will make what has been described as necessary to the first fitting up of a Composing-room, familiar to every one. It was drawn by the ingenious Mr. C. Varley, by the application of his *camera lucida*. The frame is seen with the Roman cases up —the *bulk* at the end—a *galley* at the bottom—a *chase* standing, with the crosses in, for quarto or octavo, in the rim of which female dove-tails are shown to be cut for shifting the crosses to works in duodecimo or octodecimo.

The compositor, thus provided, begins his work, holding in his left hand a little instrument into which the letters are conveyed from the cases. This is called the "composing-stick;" but the peculiarities necessary to its perfect construction are stated in our next chapter.

Before the compositor begins his work he "makes his measure;" that is, he moves the slide of the composing-stick to the chosen width of the page. He next cuts, from a thin slip of brass plate, a piece to the length of the intended line, of the same height as the type, and with a projecting "knib" at one end. This is called the "setting rule," as against this the letters are to be placed. He then places himself opposite the centre of the lower case, and fixes his copy before him, secured by the simple contrivance of a slip of lead, a cord, and a counterbalancing weight, which appears in the engraving as lying over the back of the frame.* Then taking the composing-stick in his left hand, his thumb being over the slide, resting on the setting-rule, with the thumb and first finger of his right hand he takes up the letters, spaces, quadrats, &c. one by one, and places each upon the setting-rule, supporting, and placing them together by the action of the left thumb, the other hand being instantly disengaged for picking up the next letter. The whole of these movements are performed with a degree of facility not easily conceived by a stranger to the art. Upon arriving to near the extent of his measure, he observes whether the line will end with a complete word, or an entire syllable, including the hyphen, and if his last word or syllable happens exactly to fill the measure, or makes the line completely tight, he has nothing more to do to that line, but proceeds to the next: but if (which is far more likely to be the case) he finds the measure not entirely filled by perfect words or syllables, he increases the distances between the words in that line, adding more spaces equally between each until the measure is moderately tightened. This operation is called "justifying," and, if done properly, is attended with much nicety and skill; every line requiring to be of an equal degree of tightness; neither too closely wedged into the composing-stick, nor yet at all loose and uneven; neither the words spaced too close together in one line nor too wide apart in the others. This is one great criterion of a good workman. The compositor may as often have to lessen the spaces first used in a line as to add to them, particularly in narrow measures of large type, containing, of course, fewer words in a line; and it frequently happens that a long monosyllabic word, or syllable, will not, as the line is first spaced, go in at the end, and to drive out which the line would appear with great gaps; he must, therefore, in such a case, change his spaces for thinner, some of which, from their being very thin, are called "hair spaces."* The line having been completed, the brass rule is drawn out and placed over or upon that line, and the compositor proceeds with the next, and so on with the succeeding lines, until his composing-stick is filled, which takes, perhaps, ten or twelve lines of middling-sized type. He then places the setting-rule in front of the last line, and fixing his fore-finger of each hand in front of the rule, he presses the middle fingers against the sides of the lines, and his thumbs behind the first line, raising the whole out of the composing-stick at once. He thus conveys the "stick-full" to the "galley" (a thin board of mahogany, or wainscot wood, having ledges on two sides) disengaging the thumbs as he places the lines against the head of the galley, or against the lines which have been previously emptied and placed thereon.

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* In France and Germany they have a more elaborate utensil made for this purpose, which, having a steel point at the extremity, is stuck in the bars or boxes of the lower case; a representation of which may be seen in the dexter claw of the eagle in the vignette in the title.

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* Spaces may here be defined as pieces of metal of various degrees of thickness, shaped exactly as the stems of the letter; but not standing so high, do not consequently receive the ink, and therefore give no impression on the paper.

Having set sufficient for his page, and placed the head-line at top, and signature or direction line at bottom; and also, generally, an additional line of quadrats, he ties it round with three or four yards of small cord, called sealing twine, technically "page-cord," and removes it from the galley on to a page-paper, when it is placed on the bottom board of his frame, or other safe and convenient place. In this manner he proceeds till he has composed as many pages as are required to make a half-sheet, or sheet, according to the nature of the work.

The next process is, to arrange the pages, thus far proceeded with, for *imposing*. A large oblong stone, or marble, of perfectly plane surface, five to eight inches thick, fixed in a strong frame, so as to form, as it were, a table, with drawers underneath for "furniture," must be provided for this purpose, on which the pages are curiously placed, according to certain rules of the art, so that, when printed, and the sheet folded, they may fall in regular succession, page 2 on the back of page 1, 4 on the back of 3, and so on. Much attention is necessary in this process, particularly in works of more pages in a sheet than folio or quarto.

Having disposed, or "laid down," the pages in this right order, the next task is dressing the "chases."* To dress the chase, a suit of furniture is necessary, consisting of slips of wood, of different breadths. Then the chase being laid over the pages, so as to inclose them, those parts of the furniture called "gutter-sticks" are placed between the respective pages. Next, another part of the furniture, called "reglets," is placed along the sides of the crosses of the chase. The reglets are of such a thickness as will so regulate the position of the pages as to give the book a proper margin after it is bound. Having dressed the inside of the pages, the compositor has to do the same with their outsides by putting side-sticks and foot-sticks to them. Thus the pages being all adjusted to their proper distances, they are all untied and fastened together by wooden wedges, called "quoins." These wedges being firmly driven up the sides and feet of the pages, by means of a mallet and a piece of hard wood, called a "shooting-stick," all the letters in each page are fastened together in one mass. Before beginning to lock up, and again after he has gone the last round with the mallet and shooting-stick, the compositor "planes down" the "forme,"* to make the surface of the type stand flat and even, by blows of the mallet upon a piece of smooth wood laid upon the pages, called, from its use, "a planer;" and it is then ready for the pressman, who lays it upon the press, for the purpose of pulling a proof. This having been done, the forme, or formes, must be rubbed over with a brush dipped in strong lye, made with pearl-ash and water, and being carefully taken off the press, the proof and formes are delivered to the care of the compositor.

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* *A Chase* is a rectangular iron frame, the dimensions of which differ according to the sizes of the paper to be printed. Two cross-pieces of the same metal, called "long" and "short cross," having small dovetails at each end, so that they may be taken out or replaced as occasion may require, are fitted to each chase. By the different situations of these crosses the chase is altered so as to suit different-sized volumes, as folio, quarto and octavo, duodecimo, eighteens, &c.

As it is impossible for the most skilful workman to compose his work so correctly as to want no further alteration before the number wanted is worked off, the next thing to be done is, to put the proof, with the copy from which it has been composed, into the hands of the reader or corrector, whose business is, to read over the whole proof two or three times with great care and attention, and to mark the *errata* in the margin of every page. The corrections are always placed against the line in which the faults are found; and certain marks are used to denote the different corrections, all of which will hereafter be minutely described.

After a proof has been compared and read by copy, and the faults noticed by the reader, it is returned into the hands of the compositor, who proceeds to correct in the metal what has been marked for correction in the proof. For this purpose he lays the forme on the imposing stone, and unlocks it by loosening the quoins, or wedges, which bound the letters together. He then changes the faulty letters, or words, and alters his spaces before he drops the line. When there are any considerable alterations, and particularly where insertions or omissions are to be made, there will often be a necessity of "over-running" to "get in" or "drive out;" and to effect this, the compositor must decompose or convey the lines back from the galley again into the composing-stick, to be new spaced and justified according to circumstances. If, for example, the word or words to be inserted in a line cannot be gotten in by lessening the spaces between the words of that line, part of it must be put back into the end of the preceding line, or forward into the beginning of the subsequent one, by lessening the spaces in either or both, till room has been obtained. If the insertion be large, it may be necessary to over-run several lines, either backwards or forwards, until a break, or short line, shall have been reached, when, if it be not got in, a line will be driven out; and then, to make room for that line, if there does not happen to be a line of quadrats, or white line, at the foot of that page, the next page, or pages, either forward or backward, must often be over-run before it can be finally made up.

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* The types thus fastened together in the chase are all together called *a forme.*

When any portion of the matter is to be abstracted, exactly the reverse course must be taken. If it be but trifling, the compositor takes it out and fills up the line by enlarging the spaces of that line; or by taking from the end of the preceding, or the beginning of the following. If it be more considerable, he may be obliged to over-run many lines before he can *drive out* or *make even.*

The first proof having been corrected, another is pulled to be put into the hands of the reader, or sent to the author for examination. This proof being read and corrected, as before, a revise is pulled, to see whether all the errors marked in the last proof are properly corrected. As to those faults which may have escaped the compositor, the reader, and the author, they are usually referred to in a list of errors called *The Errata.* The works of ancient printers had no errata affixed, because they corrected the faults in each copy with a pen; which was easy enough in those days, though nearly impracticable in these.

When the sheet is correct the formes are given to the pressman, whose business is to print them when they have been prepared and corrected as before described. Four things are required at entering upon this process; namely, paper, ink, balls, and a press. The paper is prepared for use by being dipped, a few sheets at a time, in water; and, afterwards being laid in heaps, to make the water penetrate equally into every sheet, a thick deal board is laid upon each heap, upon which are placed heavy weights. The reason why the paper undergoes wetting before it is printed upon, is, that it is thus rendered sufficiently soft to adhere closely to the surface of the letter when subjected to the action of the press; and, consequently, by taking up a proper quantity of ink, it is made susceptible of a good impression. It is moreover necessary that the paper should be wetted, lest its stiff and harsh nature when dry should injure the face of the letters. The different degrees of wetting required can only be obtained by practice, which depends principally upon the quality of the paper, and the size of the type; the stout and hard-sized paper requiring from four to six dips each quire; paper of a more common quality, not so many; the smaller and closer the type, also, the more wetting will be required.

The Ink is bought, of various qualities and prices, of the manufacturer.—[*See the article on Ink.*]

The Balls will be particularly described hereafter. They, when completed, have the shape and appearance of a large round-headed mallet, such as is used by stone-masons, except that their surface is much broader and rounder. A late improvement has, in a great degree, superseded the use of balls. This is a cylinder, upon which is cast a coating of composition that will be hereafter described. The cylinder has an axis with two handles; and being repeatedly rolled on the table, or stand, distributes the ink equally upon its surface, which in the same manner is transferred to the forme of type.

A Printing Press is a machine requiring very accurate mechanical construction. At the earliest period of the art it was brought so near to perfection that no very material improvements took place in its make, until Lord Stanhope invented a press constructed entirely of iron. More details upon this head will be found in the subsequent chapter; but, in order to continue the general description of the process of printing, it may be well to take the original press for our model, and to proceed; since in the Stanhope, and others which have followed, the principle is essentially the same.

The opposite engraving will show the press in perspective. To describe it and its use in detail will require some time and space. It has two principal parts, each of which is composed of several subordinate parts or members: it will therefore be necessary to describe it as dissected into its various parts, with references to the excellent engravings of Branston, which will be found in the following pages with more detailed descriptions and admeasurements. One of those which are here described as principal parts, may be called the body of the press; which is a strong frame containing the power that produces the pressure upon the paper: the other is the part on which the forme of types is laid for printing; and which is contrived, by means of an apparatus underneath, to be run out of and into the body of the press at pleasure, in order to remove the sheet when printed; and to introduce another sheet. For the convenience of changing the sheets as they are printed, frames are provided called the *tympan* and *frisket*, which fold upon each other, and inclose the sheet between them, and which are then all together folded down upon the types.

The body of the press consists of a strong frame-work of timber, a part of which is called the feet, fig. 1, having mortises to receive two strong perpendicular posts called the cheeks, fig, 2; which are supported by another lighter framing called the hind-posts and rails, fig. 3, also fixed into the feet; the cheeks are moreover held together by four horizontal cross pieces; the upper of which, fig. 4, is called the cap, its office being to retain the upper part of the cheeks at the proper distances asunder: the next cross piece, fig. 6, is called the head; it is fitted by tenons at the ends into mortises in the cheeks, and these mortises are filled up with pieces of scale-board, cards, old hat, &c., in such a manner as to admit of a small yielding or spring. The head is sustained by two long screw bolts, fig. 7, which suspend it from the cap: in the head is fixed a brass nut, containing a female screw or worm of two threads, which is fastened in the wood by two short bolts, fig. 8, to keep it up: the worm is adapted to receive the screw by which the pressure is produced. The third cross piece, fig. 9, called the shelves, or till, is to guide and keep steady a part, called the hose, fig. 10, in which the spindle of the screw (to be spoken of hereafter) is inclosed. The fourth cross piece, fig. 5, called the winter, is a massive piece of timber; it is fitted between the cheeks to bear the carriage; it sustains the effort of the press beneath, as the head does above, each giving way a little, the one upwards the other downwards, to make the pull the easier.* The spindle, fig. 11, is a solid piece of iron, pointed at the lower end with steel, having a male screw formed on its upper end, of two threads, which enters into the female screw or worm fixed in the head: through an eye in this spindle is fixed the lever or bar, fig. 12, by which the pressman gains the power for the impression. The platten, fig. 13, or surface which acts upon the tympans, is suspended from the point of the spindle by means of a square block or frame of wood, called the hose, fig. 10, which is guided by passing through the shelves, fig. 9: the lower part of the spindle passes through the hose, and its point rests in a small steel cup, fixed in a brass saucer, supplied with oil, which rests upon an iron plate, let into the top of the platten. The pressman then, by pulling the lever, which is fixed in the eye of the spindle by an iron key, turns the screw, and presses down the platten upon the forme, upon which is laid the paper, tympans, and blankets, which are brought under the platten, when the impression is to be given. That the platten may be suspended perpendicularly from the spindle, and rise up again with it, the hose is attached to the spindle by the garter, fig. 10, E, this is a fillet of iron screwed to the hose, and entering into a nick or groove formed round the upper part of the spindle; it prevents the hose falling down on the spindle. At each corner of the lower part of the hose there is an iron hook fastened, and from these to similar

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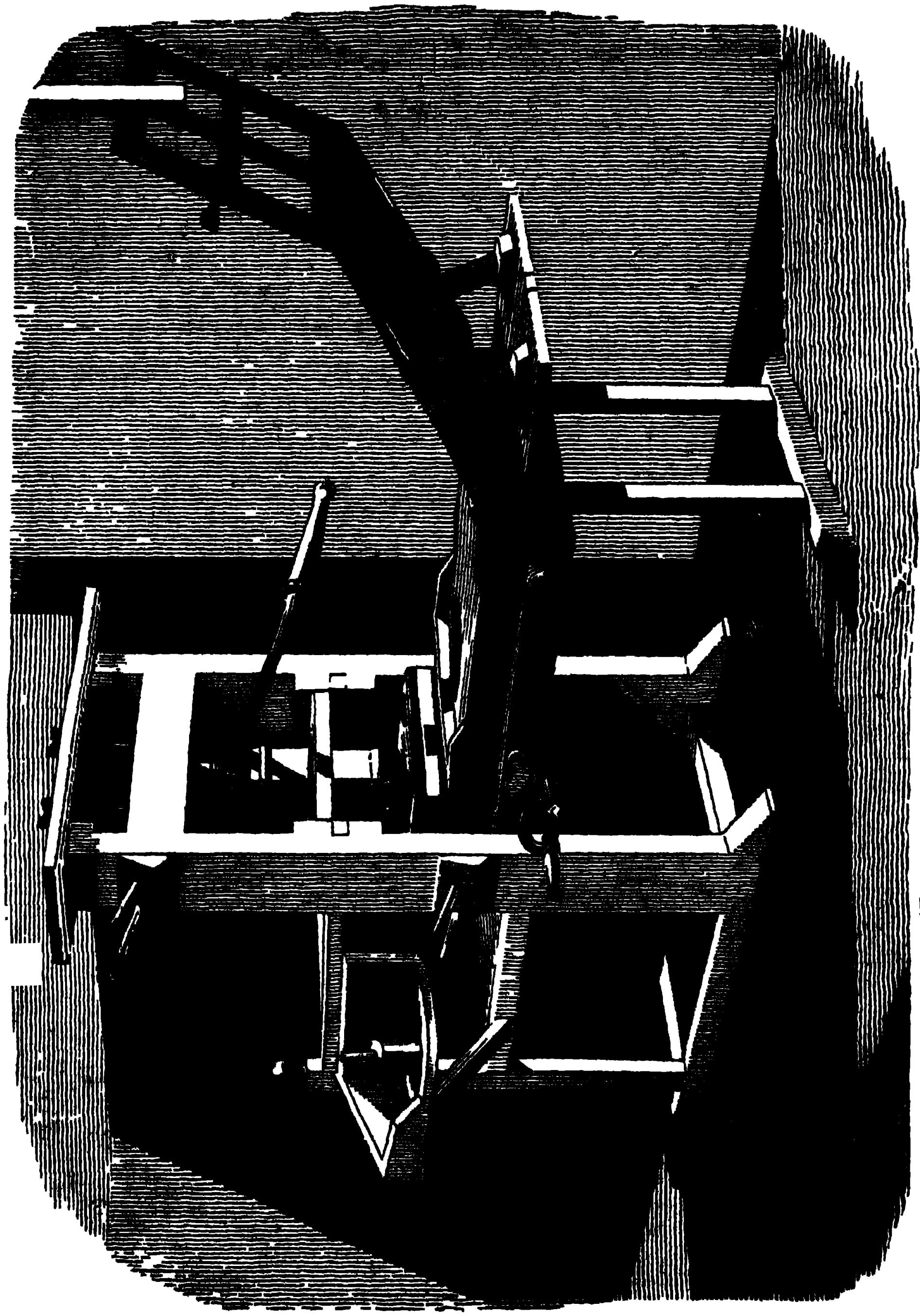
* A more erroneous principle in mechanics could not well have been devised than that which has been applied to this part of the printing-press. At one end the fore-stay supports the carriage and ribs, without a possibility of any yielding to the pull, while at the other end it is made to yield when the power of the screw, acting upon the plank, coffin, stone, and forme, is brought upon it: and therefore, if adjusted, as it is always attempted to be, truly horizontal, this part of the press must be forced into the position of an inclined plane by the yielding of the winter. This is the occasion of the disagreeable noise made by most of these presses in working; the parts cannot move truly perpendicular: the remedy is therefore obvious—let the winter lie quite solid, and the carriage and ribs truly horizontal.



The Printing Preſs of the original Construction.

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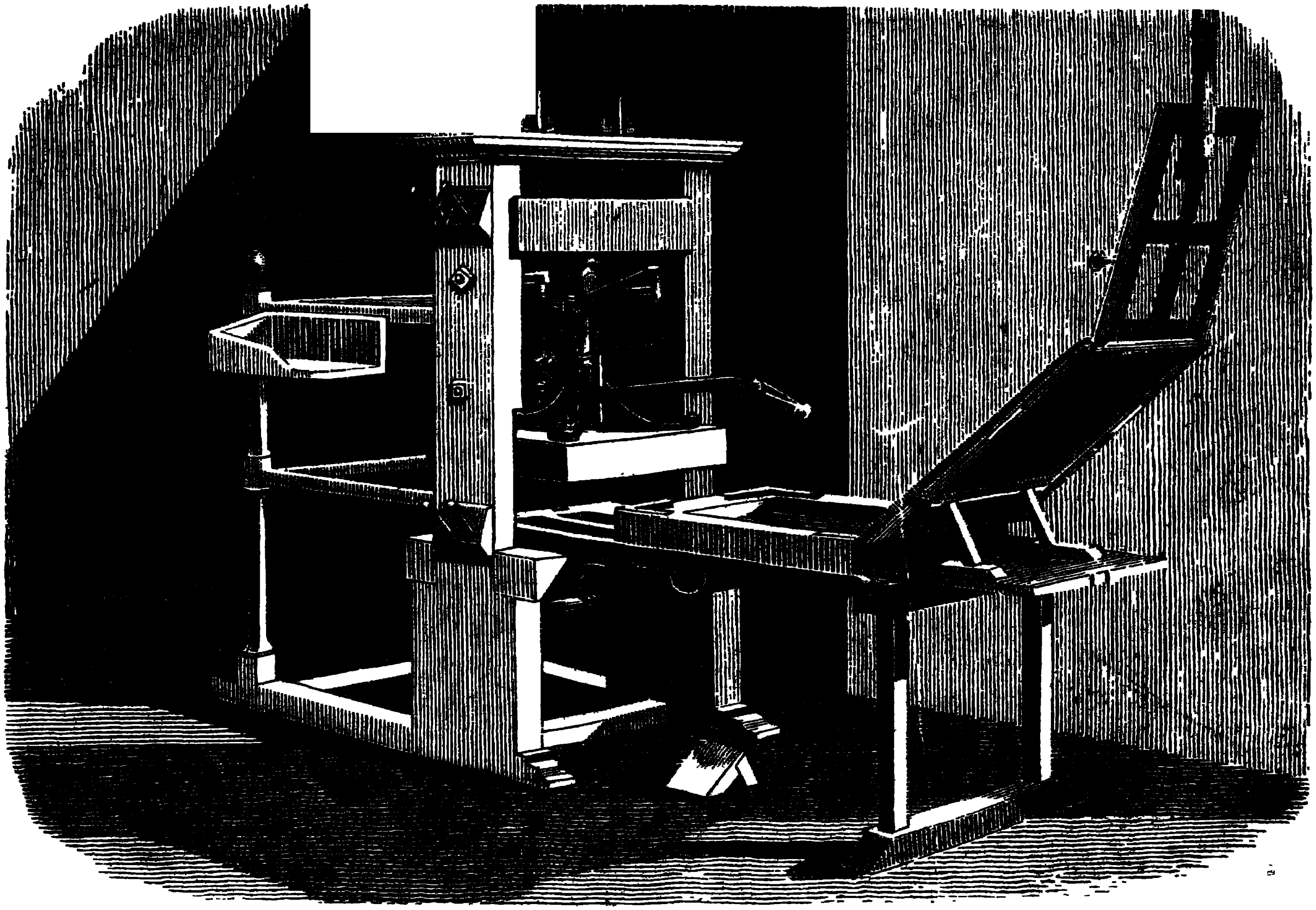

The Common Preſs with the Application of the Stanhope Power.

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hooks, fastened at each corner of the platten, cords are looped to suspend the latter, they being exactly adjusted, to hang it truly level.

The carriage,* fig. 14, is a wooden frame lying horizontally, having its fore-part supported by a wooden prop called the fore-stay, fig. 15, while the other end rests on the winter; on the rails of this frame two long steel bars or ribs are fixed. Beneath the carriage is placed an axis called the spit, fig. 16, with a double wheel of beach wood fixed on the middle of it, round which leather girths are passed and fastened, the opposite ends being nailed to each end of the plank, fig. 17; under the plank are nailed short pieces of iron or steel, called cramp irons, which slide upon the ribs, when the carriage is run in or out, by the following means: on the extreme end of the axis is fixed the handle or rounce, by which the pressman turns the axis, and this, by means of the wheel and girths, runs the forme, &c. in or out. Upon the plank, fig. 17, a square frame of wood is fixed, to form the coffin or cell, in which a marble or polished stone is inclosed, accurately bedded in bran, plaster, &c., for the forme to be laid upon. To this plank are fastened leather stay-girths, one to each end, being at the opposite ends fastened to the end rails of the carriage, to prevent the press running too far out or in.† On the fore-part of the plank is a slight frame, called the gallows, fig. 19, which serves to sustain the tympan, when turned up from off the forme, on its hinges. The tympans, figs. 20, 21, are square frames covered with parchment. The frames are made of three sides of wood, a slip of iron at the top, called a head-band. The two tympans are fitted together by the frame of one being small enough to lie within the other: the outward tympan is fastened with iron hinges to the coffin. Between the two parchments of the tympans one or two blankets are placed, either woollen, cloth, or kerseymere, according to the nature of the work, which serve to make the impression into the surface of the paper, as also to prevent the letters from being broken by the force of the press; the use of the inner tympan is to confine these blankets. The frisket, fig. 24, is a square frame of iron, made very thin, and fastened to the head-band of the outer tympan by hinges or pivots: it folds down upon the tympan, to hold fast the sheet of paper between them, the parchment or paper with which the frisket is covered being cut out in the necessary places, so that the sheet, when placed between the tympan and frisket, and both together folded down on the forme, may lie next the types in the pages; the frisket keeping the remaining part of the margin clean. The tympan and frisket, when folded down, is run in with the press; but when again run out, the tympan is lifted up upon its hinges, resting as represented, in an inclined position against the gallows, at the back part of the plank; then the frisket is turned up on its hinges, and sustained by a slip of wood or catch, hanging from the ceiling, whilst it continues open, to take out the printed sheet and put in another white sheet.

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* I am not at all satisfied as to the propriety of the appellation which has been given to the two parts of the press represented by figs. 14 and 17 It seems that the term "carriage," would more properly apply to the part, fig. 17 (to which the motive power being given, it carries in and out the forme, paper, &c.), as comprehending under one term, the coffin, plank, cramps, &c., while that now designated the "carriage and ribs," fig. 14, might with more propriety be called, "the wooden and steel ribs." Dr. Rees, in his Encyclopædia, has adopted these distinctions; but as I find such authority as Moxon, and general custom, on the other side, I must conform to what my predecessor, Stower, has adhered to in this part of the description.

† "Run in," or "run out" "the press," is the technical expression for working the plank, coffin, stone, forme, and tympans, to and fro.

To regulate the margin, that is, to make the lines and pages answer or back each other when printed on the opposite side of the sheet, two points, fig. 22, are fixed by point screws, fig. 23, to the middle of the sides of the frame of the tympan, the spurs of which make two holes in the sheet. These holes are placed on the same spurs, when the sheet is returned for making an impression on the other side, which is called the *reiteration*, and the points are so adjusted that they may make the impressions of the opposite sides exactly correspond.

The ink is laid upon the forme by balls, when the use of them is retained, which are a kind of wooden cups with handles, fig. 25, the cavities of which are filled with wool, or hair, covered with undressed sheep's skin nailed to the wood. One of these the pressman takes in each hand, and applying them on the ink-block, fig. 26, to charge them with ink, he works them one against the other, to mix and distribute the ink equally; and, at last, inks over the forme by beating or dabbing them several times over the whole face of it; this leaves the forme in a condition to be passed under the press, with the moistened paper laid on it.

To prepare for working, the parchment of the outer tympan, against which the sheet is to be laid, is wetted till it is very soft, in order to render the impression more forcible; the proper blankets are then put in, and secured from slipping by the inner tympan. Then, while one pressman is beating the letter with the balls, the other person places the sheet of paper on the tympan, turns down the frisket upon it, to inclose it, keep the margins clean, and prevent it slipping; then folding the tympan down upon the forme by a simultaneous motion of the several joints, and turning the axis by means of the rounce, with his left hand, he brings the forme, with the stone, &c. under the platten; and pulls the lever or bar with the right hand, by which means the platten presses the paper close upon the letter; by this first motion, in presses of the ordinary construction, now called in distinction " two-pull-presses," half the forme is printed; for the platten, being only half the size of the sheet, it is printed at twice, and the first time the carriage is run into the press, the pressman knows by a chalk mark previously made on the carriage when the first half of the sheet is under the platten;* then releasing the bar, he advances the forme still forward into the press, by turning the rounce, and gives a second pull: now letting go the bar or putting it gently back upon the catch against the cheek, he runs out the forme, lifts up the tympans, opens the frisket, takes out the printed sheet, and lays on a fresh one; and this is repeated, until he has taken off the impression for the full number of sheets the edition is to consist of. One side of the sheet being thus printed, the forme for the other is laid upon the press, or another press if necessary, and worked off in the same manner; the sheet being so disposed, that the spurs of the points shall pass through the holes already made in the sheet by working the first side, or white paper.

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* In this operation he places his foot against a foot-board beneath the press, and leans his body back to gain a greater purchase. Presses are, in general, adapted for the screw to make a sufficient pressure by a quarter turn of it, but this the pressman can vary to his own inclination, by packing up the head of the press with pieces of pasteboard in the mortises, till it yields as much as he requires for a long pull; or if he puts blocks of wood to fill up the mortises, it will make a short pull, which has much the advantage of the other, in respect to the total exertion it requires; but then the handle being suddenly checked on coming to the pressure, it gives a shock to the whole body, which few men can bear. Strong men will work best with a solid pull.

Sometimes it is required to cut the frisket afresh, where the second side is to be more or less full of printing than the first, as is frequently the case at the beginning and ending of books, half pages at the ends of chapters, &c.

The operations of the printing press, when conducted by an expert pressman, are performed with a surprising rapidity; but the labour is very great. Two men are required to make a "full press" (when only one is at work, it is called "half press"), who take it by turns to pull, that is, work the press; and beat or roll, that is to ink the types. Whilst one man is employed in pulling the sheet, his comrade is distributing the ink on his balls or rollers, by applying the balls to the ink-block, fig. 26, which is fixed up against the cheek of the press, and has ink spread out upon it by the slice and brayer, fig. 27, which is a wooden muller to rub out, or mix and grind the ink; then applying the balls together, and turning them by a double motion round in his hands, whilst the surfaces are rolled or dabbed against each other, the ink becomes equally distributed over them; if working with the roller, by applying it against the inking cylinder, or on the upper part of the table, and by repeatedly rolling it, in varying directions, upon the plane surface of the table, obtains a perfectly equal coat of ink upon the face of the composition: By this time the other man having made the pull, run out the press, and opened the tympan, the other instantly begins the inking, whilst the puller gets the sheet changed. In beating, he holds a ball in each hand, and applies them upon the types, with the handles in an inclined position; and then mounts the handles perpendicular, by which means the leather or skin is rolled over the surface of the types, and they are effectually inked; having thus inked a space of as much extent as the two balls will conveniently cover, they are lifted off the letters, and lightly removed on to another part, which is inked in the same manner, till the whole sheet is gone over.

The severe labour of printing by the ordinary press, rendered it very desirable to obtain an accession of power. Many attempts have been made to produce a press which would print the whole surface of a sheet at a single pull: the first was brought from

France many years ago, and called "The Apollo Press." It was a wooden press of the ordinary construction, except that the platten was composed of an iron plate instead of a wooden plank, sufficiently large to print the whole sheet at once: the under surface of it was covered with brass, and made truly flat: and the screw, or spindle, instead of being turned by the bar or handle, in the usual manner, was united, by connecting rods, with a long lever, placed at the side of the press, and the man worked it by applying both hands to the lever, to bring it down nearly by the same action as working the lever of a pump; this action, requiring a motion of the whole body, was found hurtful to the men, and in consequence they were soon disused, even for printing newspapers, where expedition is a consideration superior to every other.

Among the contrivances for improving the common printing press, the most successful in a long course of practice, was invented many years ago by Mr. Roworth, a printer in London, now of Bell Yard, Fleet Street. Instead of the screw he has a plain vertical spindle, furnished with a bar, hose, &c., just as usual; but the upper part, where the worm is usually cut, is a plain cylindric spindle, and fits into a socket fitted into the head of the press. Upon the upper end of the spindle, just beneath the head, a short cross arm is fixed, which acts against a circular inclined plane fixed under the head of the press; therefore, by turning the spindle, the cross arm acts against the under side of the circular inclined plane, and causes the spindle to descend in the same manner as the screw, but with this advantage, that the inclined plane is formed with a rapid descent at the time the action first begins; but when the platten has come down to the tympan, and the pressure begun, the plane has a very slight inclination, and therefore a great power to produce the impression; and this power increases as the resistance increases. Still, from the manner in which the platten is first brought down, there is not, on the whole, that corresponding loss of time which takes place in the usual mechanical combinations for producing a great power. A great advantage is also derived in the working of this press, from making the inclined plane and cross arm of hardened steel. It will hereafter be seen that the power of Cogger and Scott's press is acquired by a similar principle.

The Stanhope press, which is now becoming general (a detailed description of which, will be reserved for chap. vi), has this property in a higher degree, and is therefore capable of printing a double surface to the common press, with a very small portion of the power which that required.

A Stanhope press consists of a massive frame of cast iron, formed in one piece: this is the body of the press answering to the cheeks, cap, head, shelves, winter, &c., of the common press, in the upper part of which a nut is fixed for the reception of the screw, its point operating upon the upper end of a slider, which is fitted into a dovetail groove formed between two vertical bars of the frame. The slider has the platten firmly attached to the lower end of it; and being accurately fitted between the guides, the platten must rise and fall parallel to itself when the screw is turned. The weight of the platten and slider are counterbalanced by a heavy weight behind the press, which is suspended from a lever, fig. 7, acting upon the slider to lift it up, and keep it always bearing against the point of the screw. Two projecting pieces, all in one piece with the main frame, answering to the winter, are cast to support the carriage when the pull is made; to these the rails, or ribs, are screwed, and placed truly horizontal for the carriage to run upon, when it is carried under the press to receive the impression, or drawn out to remove the printed sheet. The carriage is moved by the rounce or handle, with an axis and leather girths, similar to the wooden press. The principal improvement of earl Stanhope's press consists in the manner of giving motion to the screw, which is not done simply by a bar or lever attached to the screw, but by a second or multiplied lever; thus, the screw has a short lever, fig. 1, D, fixed upon the upper end of it, and this communicates by an iron bar, or link, E, to another lever, C, of rather shorter radius, which is fixed upon the upper end of a second spindle, A, and to this the bar or handle, F, is fixed. Now, when the workman pulls this handle, he turns round the spindle A, and by the connection of the rod, E, the screw turns with it, and causes the platten to descend and produce the pressure. But it is not simply this alone, for the power of the lever, F, is transmitted to the screw in a ratio proportioned to the effect required at the different parts of the pull; thus at first, when the pressman takes the bar, F, it lies in a direction parallel to the frame, or across the press, and the short lever, C (being nearly perpendicular thereto), is also nearly at right angles to the connecting rod E, but the lever, D, of the screw, makes a considerable angle with the rod, which therefore acts upon a shorter radius to turn the screw; because the real power exerted by any action upon a lever, is not to be considered as acting with the full length of the lever between its centres, but with the distance in a perpendicular drawn from the line in which the action is applied to the centre of the lever. Therefore, when the pressman first takes the handle, F, the lever, C, acts with its full length upon a shorter length of leverage, D, on the screw, which will consequently be turned more rapidly than if the bar itself was attached to it; but on continuing the pull, the situation of the levers change, that of the screw, D, continually increasing in its acting length, because it comes nearer to a perpendicular with the connecting rod, and at the same time the lever, C, diminishes its acting length, because, by the obliquity of the lever, the rod, E, approaches the centre, and the perpendicular distance diminishes; the bar or handle also comes to a more favourable position for the man to pull, because he draws nearly at right angles to its length. All these causes combined have the best effects in producing an immense pressure, without loss of time; because, in the first instance, the lever acts with an increased motion upon the screw, and brings the platten down very quickly upon the paper, but by that time the levers have assumed such a position as to exert a more powerful action upon each other, and this action continues to increase as the bar is drawn forwards, until the lever, C, and the connecting rod, are brought nearly into a straight line, and then the power is immensely great, and capable of producing any requisite pressure which the parts of the press will sustain without yielding. The handle is sometimes made to come to rest against a stop, which prevents it moving further, and therefore regulates the degree of pressure given upon the work: but to give the means of increasing or diminishing this pressure for different kinds of work, the stop is made moveable to a small extent. A better plan is adopted by some makers of the Stanhope press, viz. to have a screw adjustment at the end of the connecting rod E, by which it can be shortened; it is done by fitting the centre pin which unites it to the lever, D, in a bearing piece, which slides in a groove formed in the rod, and is regulated by the screw. This shortening of the connecting rod produces a greater or less descent of the platten, when the handle is brought to the stop.

The carriage and platten are made of cast iron, each in the form of a box, with several cross partitions, which are all cast in one piece, and though by this contrivance metal is saved, yet it is exceedingly strong: the surfaces are made truly flat, by turning in a lathe. The slider, fig. 4, has a plate formed on the lower end of it, which is fixed by four screws upon the top of the platten, and thus they are united. The remainder of the apparatus and all the operations of working by the pressmen, are exactly the same as the common press. The iron frame of the press is screwed down upon the wooden base by bolts, which pass through feet, projecting from the lower part of the iron frame. Another wooden beam is fixed into the centre of the former at right angles, which lies upon the floor. The ribs for the carriage to run upon are supported from the wooden base by an iron bracket.

The advantages of the iron presses in working are very considerable, both in saving labour and time. The first arises from the beautiful contrivance of the levers, the power of the press being almost incalculable at the moment of producing the impression; and this is not attended with a correspondent loss of time, as is the case in all other mechanical powers, because the power is only exerted at the moment of pressure, being before that adapted to bring down the platten as quickly as possible. In the Stanhope press, the whole surface is printed at once, with far less power upon the lever than the old press, when printing but half the surface. This arises not only from the levers, but from the iron framing of the press, which will not admit of any yielding, as the wood always does, and indeed is intended to do, the head being often packed up with elastic substances, such as paste-board, or even cork. In this case much power is lost, for in an elastic press the pressure is gained by screwing or straining the parts up to a certain degree of tension, and the effort to return produces the pressure: now in this case, the handle will make a considerable effort to return, which, though it is in reality giving back to the workman a portion of the power he exerted on the press, is only an additional labour, as it obliges him to bear the strain a longer time than he otherwise would. The iron has very little elasticity, and those who use such presses find it advantageous to diminish the thickness of the blankets in the tympan to one very thin piece of fine cloth; the lever has then very little tendency to return, and the pull is easy in the extreme, requiring very little more force to move it at the latter, than at the first part: indeed, it is so different from the other press, that when an experienced pressman first tries it, he cannot feel any of that reaction which he has been accustomed to, and will not believe, till he sees the sheet, that he has produced any impression at all; and for many days after he begins to work at an iron press, he by habit throws back all the weight of his body in such a manner as to bring the handle up to its stop with a concussion that shakes his arm very much; and in consequence most pressmen, after a few hours' work, feel inclined to give up the iron press; but when they have once got into a new habit of standing more upright, and applying only as much force as it requires, the labour of the pull becomes less than that of running the carriage in and out; and men who are accustomed to the iron presses only, would be scarcely able to go through the work of the old press.

This account of the Stanhope press is partly taken from Dr. Rees's Encyclopædia, where may be seen excellently drawn and beautifully engraved elevations and plan.

CASE.

CHAPTER II.*

Of Compositor's work—Description of a Fount—Upper Case—Lower Case—Capitals—Small Capitals—Accented Letters—Numeral Letters—Figures—Reference Marks—Points—Quadrats—Spaces—Rules—Space-rules—Braces—Superiors—Fractions—Quotations—Two-line Letters—Flowers—Leads, or Space-lines—Greek and Hebrew—Mathematical, Algebraical, and Geometrical sorts.—Of casting-off Copy; various methods—Different Scales and Tables—Frame—Cases—Stone—Boards—Furniture—Side-sticks—Gutters—Cast-iron Gutters and Side-sticks—Quoins—Shooting-stick, &c. &c.—Chases—Observations on Composing—Schemes of Cases—Lord Stanhope's plan—Laying of Letter—Distributing—Composing—Composing-stick—Imposing—Schemes of Imposing various sizes of Works—Dressing the Formes and making Margin—Tables of Signatures and Folios—Locking-up—Proofs—Expedition work—Companionships.

PRINTERS divide a fount of letter into two classes.

1. The Upper-case;—2. The Lower-case sorts.

The Upper-case sorts are, Capitals, Small Capitals, Accented Letters, Figures, and References.

The Lower-case consists of, Small Letters, Double Letters, Points, Spaces, Quadrats, &c. each of which we shall treat of under distinct heads.

Of Capitals.

THE use of capitals has been considerably abridged of late years; and the antiquated method of using them with every substantive, and, sometimes, even with verbs and adverbs, is now discontinued, except in very few instances. They are considered, in the present day, as necessary only to distinguish proper names of persons, places, &c. There are, however, some particular works, in which authors deem it essential to mark emphatical words with a capital: in such cases (and there can be no general rule to guide the compositor) we would recommend the author always to send his copy properly prepared, in this particular, to the printer, or he will become liable to the charge the compositor is allowed to make for his loss of time in following his alterations. The method of denoting a capital, or words of capital letters, in manuscript, is by underscoring it with three distinct lines.

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* It will be necessary to allow, in this chapter, of some slight repetitions of the preceding.

Of Small Capitals.

THE small capitals C, O, S, V, W, X, Z, so closely resemble the same letters in the lower case, as to require particular care in the compositor to prevent their mixing, as the difference can scarcely be discerned but by their being cast thicker than the others.

In manuscript, small capitals are denoted by having two lines drawn under them.

Small capitals are used for the purpose of giving a degree more of import to a word or sentence, than can be conveyed by printing the same in italic. They are also employed for chapter heads, running heads, &c., according to the fancy of the printer. The first word of every section or chapter is generally put in small capitals, after either a full capital of its own fount, or one of a size or two larger, accurately justified so as to line at the foot with the remainder of the line, and which, from this adjustment, is usually termed a *cock-up letter*. Small capitals are also much used for the catch-lines in the display of title-pages; yet, if the office have founts whose full capitals answer to the size, they are preferable, as being less liable to "clog up" in the working. They are usually cast to the roman only; but those founts which have italic small capitals, have a very elegant addition.

Of Accented Letters.

Those which are called accented by printers, are the five vowels, marked either with an

Acute	á é í ó ú
Grave	à è ì ò ù
Circumflex	â ê î ô û
Diæresis	ä ë ï ö ü
Long	ā ē ī ō ū
Short	ă ĕ ĭ ŏ ŭ

Those who call accented letters all that are of a particular signification, on account of being distinguished by marks, reckon the French ç, the Spanish ñ, and the Welch ŵ and ŷ, in the class of accented letters, though not vowels. As the longs and shorts are used only in particular works, they are not cast to a fount of letter, unless ordered.

Of the French ç, the Spanish ñ, and the Welch ŵ and ŷ.

To make a tail to a capital C, a figure of 5 inverted, and of a small size, is not improperly used.

The ñ marked with a stroke over it, is used in the Spanish, and pronounced like a double *n*, or rather like *ni;* but short and quick, as in *España.* It is a sort which is used in the middle of words, but very rarely at the beginning.

In the Portuguese language an accent or mark called *til,* is generally used in all words which would end in *oens,* as a contraction for the *n;* it was formerly used over the ẽ, but in modern works it is used over the õ—as for instance, *informacoens, milhoens,* will be written and printed with the termination thus, ões, *informacões, milhões, &c.*

In the Welch language, ŵ and ŷ, as well as the other circumflexed letters, are used to direct the pronunciation.

Of Numeral Letters.

Numeral letters were used by the Romans to account by, and are seven in number, I V X L C D M. The reason for choosing these letters seems to be this: M being the first letter of *mille,* stands for 1,000, which M was formerly written CIↃ. Half of that, viz. IↃ, or D, is 500.—C, the first letter of *centum,* stands for 100; which C was anciently written ⊏, and so, half of it will be 50, L.—X denotes 10, which is twice 5, made of two Vs, one at top and the other at bottom.—V stands for 5, because their measure of five ounces was of that shape; and—I stands for 1, because it is made by one stroke of the pen.

Sometimes small capitals are used for numerals, in the same manner as the seven sorts of capitals; and look neater than the last; lower-case letters are also applied to the same purpose.

Arithmetical Figures.

Arithmetical or Arabic figures are nine in number, besides the cipher, or nought.

Figures require a founder's particular care to cast them exactly n-thick, and to a true parallel, as the least deviation, where a number of them come together in table-work, destroys their arrangement, and causes an inconvenience in the justification which the ingenuity of a compositor cannot, without considerable loss of time, rectify.

The excellence of figures does not consist in their having soft and fine strokes, but rather in such circles and lines as bear a proportion with the strength of the face.

The recently introduced fashion of forming the figures so that each one of the ten shall fill precisely the same portion of the shank of the type, and which are called "lining figures," are said in the work by Mr. Stower, to be "an improvement;" and that this shape "adds considerably to their appearance, and to the beauty of the work in which they are used." They have certainly been almost universally adopted: but I cannot assent to such an acquisition of stiff uniformity being of the value thus attached, until every thing in a fount be reduced to the same principle; so that capitals, ascending and descending, round and square letters, all *line* alike. On the score of the utility of the fashion, I have still stronger objections. In the figures cast after the old manner, or only modernized in the same moderate degree as the roman and italic, there is a relief to the eye, and a help to the reading of them, which is by no means afforded in the modern-cut lining-figures. This is of infinite importance where figures are without any calculations or words to lead to the detection of error, such as in works upon navigation, and particularly in tables of logarithms, which consist of heavy masses, and must be often read by the dim and imperfect light of a ship's cabin, or ward room; and by those not the best able to judge of the distinctions of figures approaching too near in likeness to one another; and where a mistake of a single figure in calculating a ship's reckoning may be of the most fatal consequences. The reason of this argument will be immediately understood by looking at the following specimens, whereby it will be seen how very possible it would be to mistake, either from imperfection in press-work, or paper, or the least inadvertency of the eye, the 3 for 8; 6 and 9 for 0; and *vice versa:* whereas, in the non-lining figures, such mistakes will hardly be possible in consequence of the 5, 6, 8, ascending, and the 3, 7, 9, descending, in line from 1, 2, 4, 0.

1 2 3 4 5 6 7 8 9 0[*]
1 2 3 4 5 6 7 8 9 0

And for a further specimen of the absurdity produced by these figures, see p. 376.

Printers at one time thought it a great impropriety to use erect figures in italic matter, judging that the obliquity of that character would be intercepted by them, and therefore had figures cast of the same inclination; this peculiarity is but partially attended to in England, though it still prevails in some parts abroad.

Scratched Figures,

~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ ~~7~~ ~~8~~ ~~9~~ ~~0~~

are used in that species of Arithmetic called Division; the dividing and divided figures being scratched as soon as they have been adjusted by subtraction and multiplication. Dotted figures,

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[*] In a page of stereotype, which will be inserted hereafter, this principle will appear very apparent.

$\dot{1}\ \dot{2}\ \dot{3}\ \dot{4}\ \dot{5}\ \dot{6}\ \dot{7}\ \dot{8}\ \dot{9}\ \dot{0}$

are also used for similar purposes.

In Decimal Arithmetic they were formerly used to denote the terminating figures of circulating decimal quantities, and also those of repeating decimals: but have of late years been considered as unnecessary in this respect, and are therefore dropped by the generality of arithmeticians.

Of References.

References are those marks, or signs, which are used in a work with side or foot notes, to direct the reader to the observations they may contain on that part of the text to which the reference may be attached, the note having a corresponding mark of reference.

They are variously represented; those generally in use are the

Asterisk . .	*	Section .	§
Dagger . .	†	Parallel . .	‖
Double-dagger	‡	Paragraph	¶

In works where the notes are numerous, superior figures and letters (^{1} ^{2} ^{3}, &c. ^{a} ^{b} ^{c}, &c.) are used, as doubling of the common references frequently causes confusion. Italic lower-case letters, between parentheses, are frequently used for references, beginning with *(a)*, and so on to the end of the alphabet.

The Asterisk, the principal of the references, is used in the Roman church-books to divide each verse of a psalm, and show where the responses begin, which in our Common-Prayer Book is denoted by a colon. It is sometimes used to supply the name of a person, in satyrical or libellous works, provided it is well understood who is meant. —— The metal rule is also much used in the same way. It is likewise used to denote an omission, or a hiatus, by loss of original copy, in which case the asterisks are multiplied according to the extent of the chasm.

The Dagger, originally termed the Obelisk, or Long Cross, is frequently used in Roman Catholic church-books, in prayers of exorcism, at the benediction of bread, water, fruit, and upon other occasions, where the priest makes the sign of the cross. But it must be observed, that it is not used in the above books unless for want of square crosses, ✠, which are the proper symbols; and are used also in the Pope's briefs, and in ordinances and mandates of archbishops and bishops, who put it immediately before the signature of their names. But the square cross is not reckoned among references of which we are speaking.

The Long Cross, or Dagger, is used in genealogical tables, and works of that description, where it denotes the death of a person, or the extinction of a family. Sometimes it serves for a signature to matter which has been either omitted, or else added; and which is intercalated after the omission; but its principal use is by way of reference.

The Double-dagger and Parallel, are considered only as references.

The Section is seldom employed now but as a reference, except in Latin notes, collected from foreign books, which generally abound with citations.

The Paragraph is least used of any of the references, in consequence of its heavy appearance, and the room it occupies, and, except in old bibles, where it was placed to denote the changing of the contents of a chapter, or in common-prayer books, to direct the order of the service, and which is called the Rubric (those lines being formerly printed in red), we may consider it as nearly abolished.

From the foregoing observations it is evident, that the symbols, noticed here as references, were originally designed for other and distinct purposes. It would not be one of the least improvements were other marks devised to supply their place, of a more elegant shape; the superior letters and figures have a neater appearance, could they be kept clear from picks in the working.

OF LOWER-CASE SORTS.

Having already considered the lower-case alphabet, it will be unnecessary to dwell long on this head, we shall therefore merely notice those sorts which have not been already treated of. Those termed lower-case sorts are, the small letters of the alphabet, double letters, points, the crotchet and parenthesis, spaces and quadrats. Of these i, v, x, l, c, are numeral letters, and are generally used in notes and indexes; the d, and m, are seldom used for those purposes, though their power is not inferior in calculation to capitals, as they are governed by the same rules.

Of Points.

They consist of a comma, semicolon, colon, period or full-point, note of interrogation and note of admiration.

Points are not of equal antiquity with printing (see p. 99), though, not long after its invention, the necessity of introducing stops, or pauses in sentences, for the guidance of the reader, brought forward the colon and full-point, the two first invented. In process of time the comma was added to the infant punctuation, which then had no other figure than a perpendicular line, proportionable to the body of the letter; these three points were the only ones used till the close of the fifteenth century, when Aldus Manutius, a man eminent for the restoration of learning, among other improvements in the art of printing, corrected and enlarged the punctuation, by giving a better shape to the comma, adding the semicolon, and assigning to the former points more proper places; the comma denoting the smaller pause, the semicolon next, then the colon, and the full-point terminating the sentence. The notes of interrogation and admiration were not introduced till many years after.

These points are allowed to answer all the purposes of punctuation, though some pedantic persons have suggested the propriety of increasing them, by having one below the comma, and another between the comma and semicolon. So far are we from imagining that such an introduction will meet with encouragement, that we confidently expect to see the present number diminished, by the total exclusion of the colon, a point long since considered unnecessary, and now but seldom used.

Perhaps there never existed on any subject, among men of learning, a greater difference of opinion than on the true mode of punctuation, and scarcely can any two people be brought to agree in the same method; some making the pause of a semicolon, where the opinion of others would only place a comma; some contending for what is termed stiff pointing, and others altogether the reverse.

The want of an established rule in this particular is much to be regretted. The loss of time to a compositor, occasioned often through whim or caprice, in altering points unnecessarily, is one of the greatest hardships he has to complain of in his profession.

It is rare, indeed, to meet with a work sent properly prepared to the press; either the writing is illegible, the spelling incorrect, or the punctuation defective. The compositor has often to read sentences of his copy more than once before he can ascertain what he conceives the meaning of the author, that he may not deviate from him in the punctuation; this retards him considerably. But here it does not end—he, and the corrector of the press, though, perhaps, both intelligent and judicious men, differ in that in which so few are found to agree, and the compositor has to follow either his whim or better opinion. The proof goes to the author—he dissents from them both, and makes those alterations in print, which ought to have rendered his manuscript copy correct.

Some compositors do not possess so perfect a knowledge of punctuation as others; to such the hardship becomes greater; the loss of time to them must be very considerable. The author should, in the first instance, send his copy properly marked in every respect. He must be the most competent judge of the length and strength of his own sentence, which the introduction of a point from another might materially alter, a circumstance not uncommon, as instances continually occur where a single point will completely reverse the meaning of a sentence.

The late Dr. Hunter, in reviewing a work, had occasion to censure it for its improper punctuation. He advises authors to leave the pointing entirely to the printers, as from their constant practice they must have acquired a uniform mode of punctuation. We are decidedly of this opinion; for unless the author will take the responsibility of the pointing entirely on himself, it will be to the advantage of the compositor, and attended with less loss of time, not to meet with a single point in his copy, unless to terminate a sentence, than to have his mind confused by commas and semicolons placed indiscriminately, in the hurry of writing, without any regard to propriety. The author may reserve to himself his particular mode of punctuation, by directing the printer to point his work either loosely or not, and still have the opportunity of detecting in his proofs whether a misplaced point injures his sentence. The advantage resulting from this method would ensure uniformity to the work, and remove in part from the compositor a burthen which has created no small degree of contention.

Having considered it our duty to enter thus fully on a subject that so materially concerns the compositor, we will proceed to the points themselves; not with the view of laying down any rule, which we conceive impracticable, but for the purpose of explaining each in its proper order. An uniform and correct mode of pointing must be acquired by the compositor from practice and attention.

The comma, which is considered the first, from requiring the shortest pause, its time being counted as equal to that taken by the reader for the pronunciation of one syllable, is more frequently used, and misused, than any of the other points. Its unnecessary introduction often involves the reader in perplexity; and its omission blends sentences that should be kept distinct—and, in unskilful hands, may pervert the meaning of the author, and render it ridiculous. The most acceptable mode seems to be what is termed *easy pointing*, which certainly has the advantage of not confusing the reader.

The comma, having the first place in every sentence, though, strictly speaking, it may be considered a junior stop, governs the order of all the others; therefore the ready way to uniform pointing is, to acquire a perfect knowledge of this key to punctuation.

Commas are used to denote extracts or quotations from other works, in dialogue matter, or any passages or expressions not original, by inverting two of them, and placing them before the passage quoted, and closing such passage with two apostrophes. These are termed " inverted commas;" and when used, a thick space is sufficient to keep them free from the matter. The method of running them down the sides to the end of the quotation has been found inconvenient, particularly where a quotation occurs within a quotation, or a speech within a speech; the proper method of distinguishing which is, by placing a single inverted comma, and running one down the side till such extra quotation is concluded, which cannot well be done when the double commas are also run down. Such extra quotation to be concluded with a single apostrophe; or should both quotations close together, put three apostrophes, observing after the first to place a thin space.

Inverted commas owe their origin to one Guillemet, a Frenchman, who, it may be supposed, was no friend to Italic, they being intended to supersede the use of that letter. As an acknowledgment for this improvement, his countrymen call them after his name, Guillemets.

A single comma inverted is used as an abbreviation to the word Mac, in lieu of a superior ^{c}, as in the instance of M‘Gowan.

The semicolon is allowed a space of time double that of the comma, and may be considered an important point in punctuation; it enforces what has been illustrated by the comma, and allows the reader an opportunity to acquire a perfect view of the sentence, before it is terminated by the full point.

The colon, whose allowed time is one half more than the semicolon, has been superseded in almost every instance, either by the semicolon, ellipsis line, or metal rule, and in some cases by the comma; neither is its utility in figure-work any longer acknowledged.

The full point is used to terminate a sentence, and its pause is double the time allowed to the semi-colon. It is also used in abbreviations, but then loses its effect as a full stop in the punctuation, unless at the end of a sentence. Some authors, enemies to the introduction of many points, will even omit the semicolon after an abbreviation, leaving the full point an indefinite pause to the discretion of the reader.

Full points are sometimes used as leaders in tables of contents, figure-work, &c. but dotted rules ... or quadrats are much better for this purpose, from their uniform appearance, as they not only supply the place of full points and quadrats, but save considerable time in the composition.

The pause for a note of interrogation is rather longer than that allowed to the full point.

The note of admiration, or exclamation, is placed wherever surprise, rapture, &c. are expressed.

Exclamations are sometimes mistaken for interrogations, and *vice versâ;* care should, therefore, be taken in examining to which of these two variations the one or the other inclines. The Portuguese and Spanish typographers guard against this mistake by placing the interrogation, reversed, ¿, at the beginning of the sentence.

All the points, except the comma and the full stop, have a hair space placed between them and the matter, to distinguish them ; the comma and full point, not lining with the depth of the face of the letter, do not require any space to bear them off.

The m-metal rule, though it cannot be denominated a point, is frequently used in peculiar works, sometimes as a substitute for the comma, at others for the colon ; and is found particularly serviceable in rhapsodical writing, where half sentences frequently occur.

The Hyphen.

To divide words or syllables with propriety is an important part of a compositor's business. It will exercise his judgment, and demands particular attention, as authors must leave the use of the hyphen to the discretion of the printer.

The difficulty that formerly existed as to the proper method of dividing syllables, arose from the controversies in which authors were continually engaged on the subject of orthography. Without being able to establish a criterion, each arrogated to himself the adoption of his own particular mode, to the subversion of uniformity and propriety.

The dictionary of Dr. JOHNSON was looked up to as the highest authority, and the labour of that great man seemed to be crowned with complete success. It silenced those pedantic clamours and divided opinions which distracted the attention of the compositor, and he was able to solve any difficulty by a reference to this excellent standard of English orthography. But an age for improving has rendered it necessary even to improve upon Johnson, and TODD's Johnson, by embracing words newly naturalized in our language, has completed the task of the lexicographer up to the present time. Authors of the present day seldom interfere with what is now deemed the province of the printer : they will generally allow him, from his practice, to be a pretty competent judge of orthography, and therefore not object to his mode of spelling, though it may vary from their own. To the compositor this is an advantage of considerable importance, as it allows him to observe a system in his spelling, and enables him, at the same time, to acquire the proper use of the division, in which he should be careful not to suffer a syllable of a single letter to be put at the end of a line, as *a- bide, e- normous, o- bedient,* &c. except in marginal notes, which, from their narrow measure, cannot be governed by this rule. The terminating syllable of a word should not be allowed to begin a line, as *ly, ed,* &c. the hyphen being the thickness of one of the letters, the measure must, therefore, be very narrow, or the line very closely spaced, that will not admit the other. A compositor who studies propriety and neatness in his work, will not suffer an unnecessary division, even in a narrow measure, if he can avoid it by the trouble of overrunning two or three lines of his matter.

In large type and narrow measures the use of the division may admit of an excuse; but, in that case, care should be taken that they do not follow each other. In small type and wide measures the hyphen may generally be dispensed with, either by driving out or getting in the word, without the least infringement on the regularity of the spacing. The habit once acquired of attending to this essential point, the compositor would find his advantage in the preference given to his work and the respect attached to his character, from his being considered a competent and careful master of his business. The appearance of many divisions down the side of a page, and irregular spacing, are the two greatest defects in printing.

It is proper, if possible, to keep the derivative, or radical word, entire and undivided; as *occur-rence, gentle-man, respect-ful,* &c.

The hyphen, or division, is likewise used to join two or three words together, which are termed compounds, and consist frequently of two substantives, as *bird-cage, love-letter*, &c.; likewise what are termed compound adjectives, as *well-built house, handsome-faced child,* &c. But compounds are sometimes made of words that were never intended for such; therefore, to acquire a competent knowledge of them does not depend upon fancy, but exercises the judgment in discovering the rise and fall of the tone, which is an adjunct; and whether that and the preceding appellative may not be joined into one word, rather than make a compound of it.

The prepositions *after*, *before*, *over*, &c. are often connected with other words, but do not always make a proper compound; thus *before-mentioned* is a compound when it precedes a substantive, as, in the *before-mentioned* place; but when it comes after a noun, as, in the place *before mentioned*, it should be two distinct words.

Divisions are sometimes used in table-work, indexes, or contents; but, like the full point, they are now generally superseded by dotted quadrats; for they will not always come off clear, and frequently cut the paper, unless worked with extraordinary care.

Divisions should not be cast of too thick a body; their principal use is in justifying and correcting, therefore they cannot be too thin to be serviceable: they do not require a very bold stroke, except for spelling-books, for which they are generally cast on purpose.

The two Signs of Intercalation, the Parenthesis and Crotchet.

The use of the parenthesis is to inclose such words or sentences of a period as make no part of the subject, yet at the same time strengthen the argument; which, however, would read smoothly on were the enclosed matter taken away.

Parentheses are not now so generally used as formerly: authors place their intercalations between commas, which make them equally as intelligible as though they were inclosed between parentheses, and look much neater in print; but where parentheses are used, should a point be requisite to mark the sentence, it is placed after the parenthesis, the intercalation not being reckoned any part of that sentence; as, for instance, *My Lord (said I), I will tell your Lordship*, &c.

Crotchets are so seldom made use of now, that they require little notice: both parentheses and crotchets were formerly used to inclose folios, &c.; but the modern method of putting folios in full-faced figures, unattended, leaves the crotchet scarce a duty to perform; its chief application is in dictionaries, for what are called *lock-up words*, and to enclose references.

The Apostrophe.

The Apostrophe is called a sign of abbreviation, its appearance often ejecting some letter or letters from the word to which it is attached, particularly in poetry, where it often contracts two syllables into one, to give a verse its proper measure; to this the vowel e yields oftener than any other letter, as *alleg'd, chang'd,* &c. Sometimes it cuts off a vowel at the beginning of words, as *'bate, 'scápe, 'squire,* &c.; sometimes a syllable, as *'prentice;* but these, and many other abbreviations, are common only in poetical works, and are under the arbitration of the author, who best knows where such contractions serve his purpose.

The monosyllables tho' and thro' are sometimes shortened, but without any appearance of propriety to justify the curtailment, as they retain the same sound, and therefore the apostrophe cannot assist the versification.

The genitive case of the singular number is generally known by having 's for its termination, but is not allowed in the plural.

All quotations, which are denoted by beginning with inverted commas, are closed with apostrophes." There is no space required between the apostrophe and the matter.

Quadrats.

An m-quadrat is the square of the letter to whatever fount it may belong; an n-quadrat is half that size. In the casting of m and n-quadrats, the utmost exactness is necessary; they require particular care also in dressing, for the most trifling variation is instantly discovered, when ranged in figure work, for which purpose they are much used; and unless true in their justification by the letter-founder, the arrangement is confused to such a degree that all the pains and ingenuity of a compositor cannot rectify it. The same observation holds good with respect to figures.

M-quadrats always begin a paragraph, by indenting the first line; it is likewise the proper space after a full point, when it terminates a sentence within a paragraph.

N-quadrats are generally used after the comma, semi-colon, &c.

and sometimes after a kerned letter; but the use of the n-quadrat in spacing must be guided by circumstances.

Two-m, three-m, and four-m quadrats are likewise cast for break lines and white lines, but particularly for poetry, for which purpose they require to be as exact in their depth as the m or n-quadrat, or the matter will stand uneven where a number of them come together.

The inconvenience arising from founts of the same body not agreeing in depth is great, where the quadrats, through necessity, are sometimes mixed. It is a serious evil, and much to be deplored that some method cannot be adopted to check it. A particular work will sometimes require more quadrats than were originally cast to the letter it is done in—recourse is had to the founder, though at the time there may be a sufficiency of the same body, but a different fount, in the house, which do not exactly range, and cannot be used The printer is thus put to unnecessary expense, and, even then, it is a hundred chances to one if they do not get mixed. When they are afterwards used for ranging matter this defect will occasion much trouble and loss of time. This is but a trifling inconvenience, compared with others, some of which we have before noticed. It is astonishing that a system so detrimental and irregular should be permitted.—See p. 388, n.

Reglets, of the same body with the letter of the work, are sometimes used, instead of quadrats, for white lines; but, from being often wetted, are apt to swell, and cannot be depended on; it would be better, therefore, to use space leads, which are cast from 4, 6, and 8 to a pica, and from 4 m's to any length required.

Spaces.

THE use of Spaces is, to separate one word from another, so that the reading may appear easy and distinct. To enable the compositor to space even, and to justify with nicety, they are cast to various thicknesses—five to an m, four to an m, three to an m, and two to an m, which may, with propriety, be reckoned among the number of spaces, since they are used in the matter with the spaces. Besides these, there are what are called hair spaces, cast remarkably thin, and found particularly useful in justifying lines and assisting uniformity in spacing.

Rules.

Rules are either brass, metal, or space rules; the first are made by printers' smiths and joiners, out of rolled sheet brass, and the other two cast by letter-founders.

Brass rules ought to be exactly letter-high: if, therefore, founts differ in height to paper, from the regular standard, those rules, accurately made, are rendered useless: for if they are higher than the letter, they come off black and broad; and, besides hindering the adjoining letters from appearing, they cut both paper and tympan. On the other hand, if they are lower than the letter, they do not appear at all, especially if they are thin, and stand between matter without scaleboard at their sides; which, though (in particular cases) they may be left out in Roman letter, yet in mixt matter, or Italic, a scaleboard, at least, is required before and after a thin brass rule, to prevent its touching upon *d, f, l,* at the fore-side, and upon *f, g, j, p, y,* at the hind-side.

Brass rules being commonly cut to the length of sixteen inches, their equality, as to height, from end to end, is not always to be depended on from every one who sets up for a printer's joiner, or brass-rule cutter, and therefore should be tried, which is done by holding the foot, and afterwards the face-side of the whole length upon an even imposing stone, and observing whether light can be discovered between the rule and the stone, which, if it appears, proves the rule faulty, and shows where it drives out in height, and occasions a hollowness in some other place.

The face of rules ought also to be attended to, that it may be of an equal bold, or else tender look, according to the size of the letter or figures with which they are used. But a great difference appears in this particular, when we find it necessary to piece them; a compositor, therefore, when he is driven to this necessity, should endeavour to dress the shorter pieces, by rubbing them on the stone, so as they may appear as one length.

Metal Rules.

Metal Rules, like quadrats, are cast to m's, from the size of one to four, sometimes six m's and sometimes to an n, and are used in schemes of accounts, to direct and connect each article with its summary contents, where they stand opposite, and distant from each other; m rules sometimes stand for *noughts* in columns of figures.

Metal rules, made to line and join accurately, are very useful, as they serve not only for rectilinear, but also perpendicular progressions, where no other rules are to touch them. But though they have shouldering sufficient to bear off the matter, they require, nevertheless, a scaleboard, or, if it will admit, a reglet before and after them, that they may run straight, and meet with nothing that can throw them out of line.

Sometimes a rule stands for a sign of repetition, in catalogues of books, goods, &c. where it implies *ditto* or *ejusdem,* instead of repeating an author's name, with the title of every separate treatise of his writing: but it must be observed, that no sign of repetition, either *ditto, ejusdem, idem,* or the rule, must be used at the top of a page or column; but that the name of the author, or merchandize, must be set out again at length; and then if their series continues, to denote the continuation thereof, at every article subsequent, by a rule of three or four m's, so as to range, instead of extending the rule to the different lengths of names.

A metal rule likewise stands for *to,* or *till,* as chap. xvi. 3—17. that is, verse three to seventeen. At other times it serves for an index, to give notice that what follows it is a corollary of what has preceded; or otherwise matter of import and consequence.

Space Rules.

SPACE RULES are not always of the same thickness, though two of them generally answer to the depth of a pearl body. But this is not of so much moment as their being of a neat look, and made to join well; in which case they may be considered valuable sorts. They may be cast to various widths, from one m to six, to whatever body ordered.

Braces.

BRACES are used chiefly in tables of accounts and similar matter, that consists of a variety of articles, which would require much circumlocution, were it not for the method of tabular writing, which is practised in England to greater perfection than in any other nation.

Braces stand *before*, and keep together, such articles as are of the same import, and are the subdivisions of preceding articles. They sometimes stand *after*, and keep together, such articles as make above one line, and have either pecuniary, mercantile, or other posts after them, which are justified to answer to the middle of the brace.

The extreme points of a brace are always turned to that part of an article which makes the most lines.

Braces are sometimes used horizontally in the margin to cut off a chronological or other series from the proper notes, or marginal references, of the work. They are generally cast to two three and four m's of each fount, but can be made larger if ordered. When there is occasion for them larger, *middles* and *corners* are cast, and used with metal rules, so that the brace may include any space required; but the middles and corners, as well as the metal rules, require to be cast with great exactness, that, when joined, they may appear as one piece; their shoulders in dressing should be planed away, so that the beard may not prevent the face from meeting. The difficulty of nicely effecting this has caused some printers, most eminent for their skill and experience in table-work, to form their braces out of brass rule to the exact lengths required for each occurring instance. The indefatigable attention for so many years of the gentleman who has the appointment of printing the Journals and other papers for the House of Commons, to every means by which excellence was to be accomplished, has enabled him to plan and execute some of the most difficult and elaborate tables which our profession can exhibit, in a manner which ranks him with the highest in this beautiful branch of printing: and no work can exemplify more fully the success of employing brass rule in braces than the extraordinary parliamentary tables which he has printed.

Middles and corners are convenient in genealogical works, where they are used the flat way; and where the directing point is not always in the middle, but has its place under the name of the parent, whose offspring stands between corner and corner of the brace inside, in order of primogeniture: but this may also be superseded to advantage by the judicious use of brass rule.

Superiors.

a^{a}, b^{b}, c^{c}, d^{d}, e^{e}, f^{f}. a^{a}, b^{b}, c^{c}, d^{d}, e^{e}, f^{f}.

1^{1}, 2^{2}, 3^{3}, 4^{4}, 5^{5}, 6^{6}, 7^{7}, 8^{8}, 9^{9}, 10^{10}.

As we have already treated of Superior Letters and Figures under the head of References, it will not be necessary to take further notice of them here, than to observe, that they should contain no more than the bare alphabet, without any double letters. Neither ought the j to be used as a reference, on account of its being a descending letter. A larger number should be cast of the first eight sorts, a less of the second, and a still less quantity of the third eight sorts, because it often happens that references begin with ^{a} in every page; though sometimes they are continued to the end of a chapter, or other division of a work, in which case they may run the length of the alphabet. I prefer italic to roman.

The same rule may be observed in respect to superior figures, more of the first five being used than of the others, except the nought, which may be used as a degree in computations estimated by the divisions of a circumference of a circle.

Fractions.

FRACTIONS, or broken numbers in arithmetic, are seldom cast to any other bodies than those of pica, and long-primer; brevier are rather choice, from their great expense, and in the stock of but few offices; however, fractions may be had to any body required. The pica is equal to two nonpareil bodies, and the long-primer to two pearl.

The separatrix, or rule between the numerator and denominator, was formerly joined to the foot of the first: but it is considered that the figures of 3, 4, 5, 7, 9, are thereby cramped, and for that reason it is now cut to run in the top line of the denominating figure, which is a considerable improvement. $\overline{3}\ \overline{4}\ \overline{5}\ \overline{7}\ \overline{9}$ $\frac{575}{52}$

The goodness of fractions does not consist in their having a small and fine face, so much as in showing themselves full and clear, and preserving due proportion.

Where a fraction happens with large-bodied figures, such as great-primer, and upwards, it is usually set out at length, unless nonpareil figures can be conveniently had, which may be justified with a space, of the same neatness as fractions cast to the body.

Quotations.

Quotations are cast to two sizes, of unequal squares, which, as they are formed for use, are called *broad* and *narrow*. They require to be dressed and finished with as much care as any other sort, that they may stand true upon all occasions. They vary in size according to the standard of the foundery they are cast at, which is highly improper, as they should be governed by a regular standard as well as every other sort, and to that standard press-joiners ought to cut their furniture; but we are sorry to observe so little attention paid to this important part of the joiner's business, who follow too much in the steps of the letter-founder, and cannot decide on and adhere to a standard gauge for their furniture. This want of uniformity gives the compositor much trouble in making margin, and with all his care a forme will sometimes go to press imperfect in this respect, which is immediately discovered on laying on the reiteration. The pressman has then to unlock the forme in order to make register; from this a dispute will too frequently arise between him and the compositor; and, what is still worse, from frequent unlocking on the press, the pages will suffer some derangement, so that the most skilful corrector's endeavours to send a work perfect to press will be frustrated.

Quotations should not be cast so high as they sometimes are, for no other purpose than to increase their weight; if they are above the height of a quadrat, they will black the paper; and the pressmen, who are generally not very patient in remedying what may obstruct the progress of their work, generally apply to the sheepsfoot, by which means they are rendered useless.

Justifiers are cast for broad and narrow quotations, to all sizes, from double pica to pearl inclusive, for the purpose of ranging the side-note with its proper text; in doing which great care is requisite, especially where there are many in a page.

Two-line Letters.

They are cut to all the bodies in general use, and are found extremely useful in titles, the beginning of chapters, &c.

Flowers.

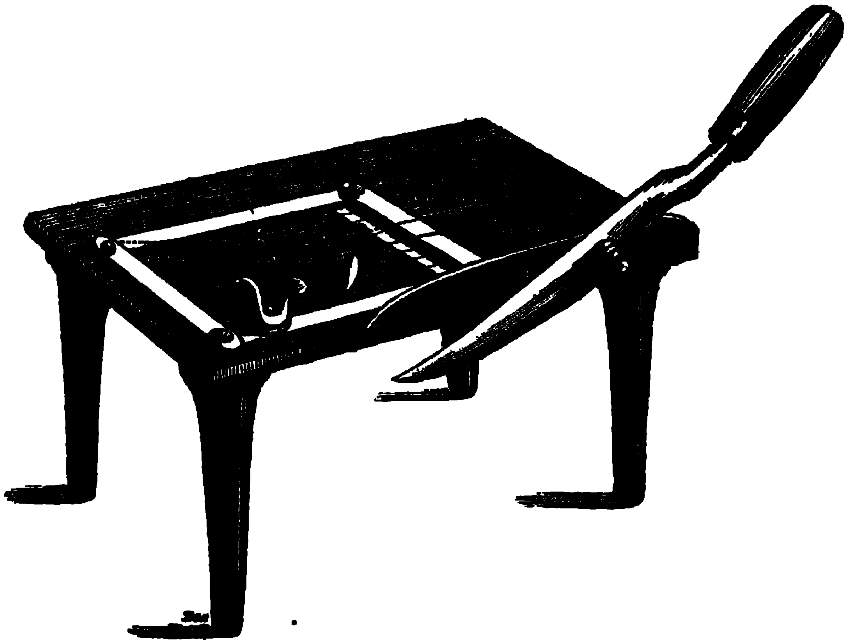
Flowers were formerly considered of the first importance; and the ingenuity of the compositor, in forming devices with different kinds and sizes of flowers, was completely put to the trial. Master-printers have now reason to rejoice that the present improved taste in printing has eased them of the burthen of expensive founts of flowers.

They are still used in some of the country towns of England, but principally as borders to titles and cards; letter-founder's specimen-books generally contain an ample assortment, which are cast to all the regular bodies of letter.

Leads, or Space Lines,

form a very important part of a printer's stock in trade, since it is scarcely possible to set up a single page in which they may not be usefully employed; but their chief use is for opening the lines to a regular distance from each other (which will be understood by referring to the explanations of the various sizes of type). They are usually cast by letter-founders in a long mould, and then cut to the required lengths. The bodies are regulated by pica standard, and they are usually cast four, six, or eight to pica; but are occasionally varied from one down to fourteen to pica. The lengths also vary according to convenience; twenty m's pica may be called about the average length for common use; though they are cut to almost every length, in order that, by being combined, they may suit every measure. Lest, therefore, the printer should not be sufficiently versed in the rule of addition, the founders used to be good enough to give a table in their specimens to assist him in computing the proper combinations of his space-lines. I have one now before me, "A TABLE, Showing how the following Pieces of Metal Space-Lines may be combined to the Length of any Number of PICA m's, from Eleven to Fifty, with only three Pieces in the longest Line; and from Fifty to an Hundred, with no more than Six Pieces in the longest Line;" in which some miraculous results of combinations are shown, beginning with 7 and 4=11, and ending with plain demonstration that five pieces of 20 m's each will make 100!

The great expense of this article in a printing-office made it necessary, as far back in time as the oldest printers can remember, to have recourse sometimes to sheet or milled lead, particularly where leads were required for any unusual measure; or upon occasions where the office was not provided with that particular variety wanted, and time would not allow of the slow process of casting, even when the letter-founder was within reach. The sheet-lead, in such cases, having been procured from the flatting-mill, was cut by the compositors, by hand, with shears. This process was also slow, and uncertain as to the nicety acquired. The mode in common practice of approaching towards accuracy in this expedient was the nailing together by the ends, at equal distances, pieces of broad quotation, cut to the measure required, and scoring the lead through these pieces with the bodkin; and then, with as much accuracy as the hand, eye, and haste would allow, applying the shears, and cutting the lead into pieces and strips, as marked: and this was seldom attempted but in lead of the thickness of about six or eight to pica. The want of accuracy sufficient in the leads thus cut to admit of their being used without the safe-guard of placing n-quadrats at the ends of the lines, and thus, by the regulation of prices of 1793, increasing the expense of the work as if it were an m wider than will appear on paper, and the serious expense of the alternative of providing leads at from 2*s*. 6*d*. (six to pica) to 12*s*. or 14*s*. a pound, induced me to try some experiments with a block of wood, a pair of common shears, and a few sash-screws, to reduce the cutting to some more certain rule, and more expeditious mode of operation. My rough experiments completely succeeded; and having done sufficient to show a proper mechanic what I wanted, with his assistance I completed my little machine (if such appellation do not imply too much for an article so portable and simple) for cutting leads, space-lines, brass-rule, or other purposes; and of which I here present an engraving.



The stand, or table, represented in the above figure, is about 18 inches long, 12 inches broad, and 9 inches high, and may be made of iron, brass, or thick wood: an old mahogany platten served for the top of mine. The shears are fixed to the front edge of the table, so as to make the blade next it steady and immoveable, by means of blocks screwed through its haft and over the pivot screw; while the other blade, which works on the pivot, has a shank straightened out to receive a wooden handle, and give sufficient power to the operator. Upon the upper surface of the table a parallel motion is contrived, by means of four bars, having screws at the ends, so as to form, when in the position shown in the drawing, a rectangular parallelogram, the two further screws holding that bar parallel to the front of the table in a fixed position, strictly parallel to the front edge of the shears; the other three bars being moveable on the screws or pivots at the corners, so as to admit of the two end bars being brought to any degree of inclination with the further bar, and by which motion the front bar is consequently carried in a parallel direction to any required distance from the front edge of the table, or shears. To the front bar is attached a bolt with a nut and screw; and a groove is made in the surface of the table of such a segment of a circle as to admit the bolt to pass backwards and forwards freely when the screw is loosened and the parallel put in motion; by means of which screw the front bar is fixed at any chosen distance from the cutting edge of the shears. At a right angle to the edge of the shears is let in, to a level with the surface of the table, a plate of brass, graduated to pica m's, from 4 to 50. Being provided with the lead, flattened to the required thickness, in sheets of any length, and five or six inches broad, let the parallel be set by the sçale to the *measure* of the work; say, for instance, 20 m's pica, as shown by the dotted lines; by passing the sheet with the left hand between the blades of the shears, and holding the edge (the rough having been first taken off) firmly against the front bar of the parallel, and applying the right hand to the wood handle of the shears, the piece will be cut to the exact measure; and so proceed, until as many pieces are cut as are judged requisite for the purpose. Then loosening the thumb-screw, the front bar is to be brought forward towards the shears till the whole forms a rectangle, which will be at the mark four m's pica; and each piece of lead which had been before cut to the measure being brought separately into the bite of the shears, and pressed against the front bar (the rough edge being first squared off), and cut through, one after another, until they have all passed through the shears; the leads will have been thus prepared of proper length and width for placing between the lines of the work. From the mark, 4 m, the front of the table is sloped away to allow the leads, as fast as cut, to fall down under the table: and thus a few hours suffice to cut as many leads with undeviating accuracy as it would have taken days to cut them by the former uncertain method; indeed, so admirably does the instrument effect its purpose, that no one can distinguish, by the eye alone, a lead so cut from one that is cast. If, at first using the machine, the eye should not be found sufficiently accurate in squaring off the rough ends before cutting, this operation may be reduced to a certainty by the following easy method: let the front bar of the parallel be brought forward, so as to set it in the rectangular position, and turn the piece of lead to be squared to the contrary side of the shears, then resting the already-cut edge against the other bar of the parallel, and passing the rough end under the edge of the shears, it will be found exactly squared.

In proof of the advantage of this instrument in a printing-office, it is sufficient for me to state that I had occasion, recently, for some leads 6 to pica, of which my whole stock was already in use. Less than 50 lbs. would have been useless—

				£.	s.	d.
These 50 lbs. at the letter-founder's price, 2*s*. 4*d*.				5	16	8
My machine was put to work on milled lead, which is kept in my stores of various thicknesses, 4, 6, and 8 to pica, which costs me, lead and flatting, 5½*d*. per lb.	1	2	11			
Man three hours cutting		1	6			
				1	4	5
Saving, in three hours' work . . .				£.4	12	1

Nor are these leads less durable than the cast leads; and, for the trifling expense of re-melting and flatting, the same metal may, at any time, be renewed for use, so that its value is very little diminished by wear. The compositor also finds them equally useful with cast leads; and by putting a portion of old-type metal in when melting, it may be made to any degree of hardness that the shears will cut.

Another advantage of the machine is its application to table-work. Where any number of brass rules require to be cut to exact lengths, by setting the parallel to the length, and holding the rule firmly on the table, upon the brass scale before mentioned, it may be cut exactly square, and every piece of the same precise length, by which the beauty of the work will be very much enhanced.

A third use is the cutting of cards, when two or more have been worked together to save press-work: and, as a fourth advantage, it is well adapted to the cutting of cast leads down to any measure required.

The best mode of working it in each particular case is acquired by a little practice. Sometimes the article to be cut must be put in from the front, under the edge of the shears, as before described; at other times it is best to feed it by putting in from the back, and pressing the article to be cut with the force of the finger and thumb upon the table while the shears are brought into action, as the brass and the cards. Hence, without particularizing further, it will be obvious, that, wherever the peculiar action of double-edge cutting is desirable, and the article to be cut requires to be accurately squared, this machine may be successfully and advantageously brought into use.

Mathematical, Algebraical, and Geometrical Sorts.

As these varieties must form part of the stock of every printing-office calculated for general book-work, we shall give them with their names and properties.

The sign + *plus* (more) signifies addition; as $4+2$ (read, 4 *plus* 2) means that 2 is to be added to 4.

The sign − *minus* (less) signifies subtraction; as $6-2$ (read, 6 *minus* 2) means that 2 is to be taken from 6.

The sign = *equal*, or the result of the above; thus $4+2=6$ and $6-2=4$, reads 4 plus 2 equal to 6. 6 minus 2 equal to 4.

Let me here guard the young typographer from an error which is frequently fallen into, of considering that, if he does not immediately lay his hands upon the real signs of minus and equal, an m-metal rule, or parallel laid flat, will do equally well; the m-rule is much too long for this mark, and by joining to a previous or following fraction, may alter the meaning of the calculator, with the whole course of the calculation, as thus $\frac{2}{3}$—$\frac{1}{n}$; if that is avoided by putting a space, the distance will be out of proportion—it must be thus $\frac{2}{3}-\frac{1}{n}$. The parallel laid horizontally ═ is a very miserable make-shift for the equal.

ꝏ This sign was also formerly used to denote *equal*, but is become obsolete.

× is the sign for multiplication.

: denotes an arithmetical proportion; as, 7 . 3 : 13 . 9; *i. e.* 7 is as much greater than 3, as 13 is greater than 9.

:: is the sign of two equal ratios, and is placed between them; as, 6 . 2 :: 12 . 4; that is, 6 is to 2 as 12 is to 4; or that the ratio of 6 to 2 is equal to that of 12 to 4.

÷ denotes an arithmetical progression continued; as, 19÷16÷13÷10÷7÷4; *i. e.* 19 is as much greater than 16, as 16 is greater than 13, as 13 is greater than 10, as 10 is greater than 7, as 7 is greater than 4.

∺ denotes a continued geometrical proportion, or geometrical progression; as, 16∺8∺4∺2∺1; *i.e.* 16 is to 8, as 8 to 4, as 4 to 2, as 2 to 1.

□ Quadrat, or regular quadrangle; as, □ AB=□ BC; *i.e.* the quadrangle upon the line AB is equal to the quadrangle upon the line BC.

△ Triangle; as, △ ABC=△ ADC.

∠ An angle; as, ∠ ABC=∠ ADC.

⊥ Perpendicular; as, AB ⊥ BC.

▭ Rectangled parallelogram; or the product of two lines.

√ Radix, root, or side of a square.

$\sqrt[10]{}$ Square root.

⊏, or >, greater than.

⊐, or <, lesser than.

—: The differences, or excess.

These, and several other signs and symbols, are used in mathematical and algebraical works; for different authors use various signs to express the same thing; and, therefore, in mathematical and algebraical works, gentlemen should be very exact in their copy, and compositors as careful in following it, that no alterations may ensue after it is composed, such alterations occasioning great trouble, and consequent expense. Hence it is that very few compositors are partial to algebraical works, preferring plain work, even if less profitable, the composition of such works tending to injure the habit of an expeditious compositor: I can, however, from my own practice, assert that the compositor's business may, in this respect, be rendered much more pleasant and profitable by the contrivance of proper materials.

Celestial and Astronomical Signs.

The SUN is thus designated, ☉.

The characters of the twelve signs of the zodiac.

♈ Aries
♉ Taurus
♊ Gemini
♋ Cancer
♌ Leo
♍ Virgo
♎ Libra
♏ Scorpio
♐ Sagittarius
♑ Capricornus
♒ Aquarius
♓ Pisces.

The characters of the planets of ancient discovery.

♄ Saturnus
♃ Jupiter
♂ Mars
⊕ Earth
♀ Venus
☿ Mercurius.

Those of modern discovery are thus marked :—

♅ Georgium Sidus
⚶ Vesta
⚵ Juno
⚴ Pallas
⚳ Ceres.

The Moon and its changes are thus designated :—

○ Denotes a new moon
☽ First quarter of the moon
● The full moon
☾ Last quarter of the moon.

The characters denoting the aspects of the planets, thus :—

☌ Conjunctio happens when two planets stand under each other in the same sign and degree.

☍ Oppositio happens when two planets stand diametrically opposite each other.

△ Trigonus happens when one planet stands from another four signs, or 120 degrees; which make one third part of the ecliptic.

□ Quartile happens when two planets stand three signs from each other, which makes 90 degrees, or the fourth part of the ecliptic.

* Sextile is the sixth part of the ecliptic; viz. two signs, which make 60 degrees.

☊ The dragon's head, and

☋ The dragon's tail, are the two points in which, or near to which, the eclipses happen, and also signify the ascending node and the descending node of a planet.

Medicinal Signs.

℞	Recipe	ʒ	Drachma
℔	Pound	℈	Scruple
℥	Ounce	ß	Half

OF GREEK AND HEBREW.

GREEK.

GREEK is more frequently used in printing than the other peculiar characters; it is, therefore, necessary for every respectable printing-office to be furnished with that type, though not to any great amount of weight; for a quantity sufficient to serve for quotations, notes, mottos, &c. may be contained in a pair of cases, by dividing some of the boxes of the upper case for the accents, and omitting useless letters, ligatures, and abbreviations. This was impracticable when ligatures and abbreviations were in use, for then seven hundred and fifty boxes were required for the different sorts in a fount of Greek. The inducement to the first founders of the art to perplex themselves with cutting and casting so many different abbreviations and contractions was probably a desire to imitate Greek writing, and to produce in type the flourishes of the pen; but what could prompt them to confound themselves with an infinite number of ligatures, cannot so well be accounted for. Greek is, however, now cast almost every where without either ligatures or abbreviations, except where founders have express orders for them. Some few, however, not only grace Greek letter, but are also profitable to a compositor who knows how to use them properly.

Having intimated that the useful sorts of a fount of Greek letter may be lodged in a pair of cases that contain no more than two hundred and seven boxes, a scheme will be presented for that purpose, [See No. 7 & 8] which will afford a fair presumption that a great many of the sorts above referred to must be needless, where their number occupies seven hundred and fifty boxes. It must, however, be observed, that almost three hundred of these sorts have no other difference than that of being kerned on their hind side; for there has been Greek with capitals kerned on both sides. But without saying any thing more on this subject, I shall advert to the single letters of the Greek, and accordingly exhibit the alphabet, in the characters formed by the late Professor Porson.

The Greek Alphabet.

Α	α	Ἄλφα	Alpha	a
Β	β	Βῆτα	Beta	b
Γ	γ	Γάμμα	Gamma	g
Δ	δ	Δέλτα	Delta	d
Ε	ε	Ἐψιλὸν	Epsilon	e short
Ζ	ζ	Ζῆτα	Zeta	z
Η	η	Ἦτα	Eta	e long
Θ	ϑ θ	Θῆτα	Theta	th
Ι	ι	Ἰῶτα	Iota	i
Κ	κ	Κάππα	Kappa	k c
Λ	λ	Λάμβδα	Lambda	l
Μ	μ	Μῦ	Mu	m
Ν	ν	Νῦ	Nu	n
Ξ	ξ	Ξῖ	Xi	x
Ο	ο	Ὀμικρὸν	Omicron	o short
Π	π	Πῖ	Pi	p
Ρ	ϱ ρ	Ῥῶ	Rho	r
Σ	ς σ	Σῖγμα	Sigma	s
Τ	τ	Ταῦ	Tau	t
Υ	υ	Ὑψιλὸν	Upsilon	u
Φ	φ	Φῖ	Phi	ph
Χ	χ	Χῖ	Chi	ch
Ψ	ψ	Ψῖ	Psi	ps
Ω	ω	Ὠμέγα	Omega	o long

Instead of *αι* improper, *ηι*, and *ωι*, the Greeks write *ᾳ*, *ῃ*, and *ῳ*; the point under these vowels denoting the iota, which, therefore, is called the *subscript iota*.

The Greek vowels admit of two breathings, viz. *spiritus asper* [ʽ] and *spiritus lenis* [ʼ].

Spiritus asper has the sound of an h; and *spiritus lenis* denotes the absence of that sound.

All the words that begin with a vowel have one of these breathings over them; but the vowel upsilon admits of no other than the *spiritus asper* at the beginning of a word.

In diphthongs the *spiritus* is put over the second vowel; as *αὐτὸς*, not *ἀυτὸς*.

The letter *ρ*, at the beginning of a word, has an *asper* over it, as *ῥέω*; and where two *ρ*s meet in a word, the first has a *lenis* and the other an *asper*.

The Greek has three accents, viz. acute [ʹ], which can fall only upon one of the three last syllables of a word.

Grave [`], which must only be placed on the last syllable.

Circumflex [˜], which only occurs on the last syllable and the last but one.

The apostrophe [ʼ] is used for cutting off the vowels *α*, *ε*, *ι*, *ο*, and the diphthongs *αι* and *οι*, when they stand at the end of a word, and the next word begins with a vowel; as, *παρ' αὐτῷ*, for *παρὰ αὐτῷ*; *πάντ' ἔλεγον*, for *πάντα ἔλεγον*.

Sometimes the apostrophe contracts two words into one; as, *κᾀγὼ*, for *καὶ ἐγὼ*; *ἐγῶ'μαι*, for *ἐγὼ οἶμαι*; *κᾀκεῖνος*, for *καὶ ἐκεῖνος*.

Sometimes an apostrophe supplies the first vowel beginning a word; as, *ὦ 'γαθὲ*, for *ὦ ἀγαθὲ*; *ποῦ 'ϛι*, for *ποῦ ἐϛι*. This is chiefly used in poetry.

But the prepositions *περὶ* and *πρὸ* suffer no apostrophe, though the next word begin with a vowel; for we write *περὶ ὑμῶν*, *πρὸ ἐμοῦ*; *περὶ αὐτον*, *πρὸ ἐτῶν*, &c.

The diæresis [¨] separates two vowels, that they may not be taken for a diphthong: thus, *ἀϋτὴ* with a diæresis makes three syllables; but without a diæresis *αυ* is a diphthong, and makes *αὐτὴ* two syllables.

Diastole [,] is put betwixt two particles that would bear a different sense without it; thus, *ὅ,τε ὅ,τι* signify *whatever;* whereas ὅτε stands for *as,* and ὅτι for *that.* Τό,τε with a diastole implies *and this,* but when without, it answers to the adverb *then.*

The sign of interrogation, in the Greek, is made by a semicolon [;].

The colon, in the Greek, is made by an inverted full-point [·].

Such compositors and readers as are not Greek scholars, and even those who are, but have not paid attention to accents, will do well to bear in mind what has been said above concerning the proper situations of the spirits and accents; as many of the faults which so frequently offend the scholar's eye, might thereby be avoided. The following rules may be easily borne in mind:—No accent can be placed over any other than one of the three last syllables of a word. No vowel can have a spirit, or breathing, except at the beginning of a word. The grave accent never occurs but on the last syllable; and this being the case, the asper grave [῝] and lenis grave [῍] can be wanted only for a few monosyllables, and less than half the quantity usually cast would be enough in a fount. Almost every word has an accent, but very seldom has more than one; and when this happens, it is an acute thrown back upon the last syllable from one of those words called enclitics, which, in that case, has none, unless it be followed by another enclitic. In no other case than this can a last syllable have an acute accent, except before a full point, colon, or note of interrogation, when the grave accent on the last syllable is changed to an acute; a circumstance which has often led printers who were ignorant of the reasons for accenting the same word differently in different situations, to think that there was an error in their copy, and thus to make one in their proof. Most errors, however, proceed from those who do not think at all about the matter.

HEBREW.

The Alphabet.

Aleph	א	
Beth	ב	
Gimel	ג	
Daleth	ד	
He	ה	
Vau	ו	
Zain	ז	
Cheth	ח	
Teth	ט	
Jod	י	
Caph	כ	ך
Lamed	ל	
Mem	מ	ם
Nun	נ	ן
Samech	ס	
Ain	ע	
Phe	פ	ף
Tzaddi	צ	ץ
Koph	ק	
Resch	ר	
Shin	ש or Sin	
Thau	ת	

Final Letters.

Letters that have a Likeness to others.

Beth	Caph
ב	כ

Daleth	Caph	Resch
ד	ך	ר

Vau	Zain	Jod	Nun
ו	ז	י	ן

Mem	Samech
ם	ס

Gimel	Nun
ג	נ

He	Cheth	Thau
ה	ח	ת

Teth	Mem
ט	מ

Ain	Tzaddi
ע	צ

The following five letters are cast broad, and are used at the end of words, viz.

Aleph	He	Lamed	Mem	Thau
ﬡ	ﬣ	ﬥ	ﬦ	ﬨ

but are not counted among the final letters, being contrived for justifying, because Hebrew words are not allowed to be divided.

Although the vowel points, in the opinion of the best scholars, are not essential to the language, yet as they are still used in some bibles, and in all works published by Jews, it may be necessary for a compositor to attend to them.

The Masoretic vowels or points are such as are here subjoined, under the consonant בּ, or beth.

1. *The long Vowels.*

Their names are—

Kametz	ָ	*aa*	בָּ baa
Tzeri	ֵ	*ee*	בֵּ bee
Long Chirek	י	*ii*	בִּי bii
Cholem	וֹ	*oo*	בֹּבּוֹ boo
Shurek	וּ	*uu*	בּוּ buu

2. *The Short.*

Patach	ַ	*a*	בַּ ba
Sœgol	ֶ	*e*	בֶּ be
Little Chirek	ִ	*i*	בִּ bi
Kametz-chataph	ָ	*o*	בָּ bo
Kibbutz	ֻ	*u*	בֻּ bu

3. *Shevas, which imply a vowel to be wanting.*

Simple Sheva	חְ	
Patach furtive	חַ	
Chataph Patach	חֲ	*a*
Chataph Sœgol	חֱ	*e*
Chataph Kametz	חֳ	*o*

The three last are called compound shevas; and in fact they are only the short vowels, to which the simple sheva (:) is joined.

Of the Relative Proportions of Type.

In conducting a printing business, it will be found of considerable importance to have a ready knowledge of the proportion which one body of letter bears to another; without this, the printer cannot form an accurate opinion as to what size of type should be used for a work which is to be confined to a certain number of sheets; nor will be able to judge of the extent of a work, after *casting off the copy,* unless he be in possession of some regular rule to guide his calculation as to the quantity of copy the type proposed may either get in or drive out.

Various methods have been recommended in works of this nature to arrive at some satisfactory conclusion upon this point, but they do not appear sufficiently clear to be readily understood, and are therefore seldom resorted to.

Among other plans which have been suggested, Mr. Stower is warm in praise of the following:—

"As scales for calculation cannot be constructed on too simple a plan, we flatter ourselves the one represented in the plate will be found to answer its purpose in every respect. The scale is cut in wood, in the manner of a rule, with the sides declining to a feather-edge; each side contains the measurement of two founts, consequently two rules will give the proportions of eight different founts, being all that are in general use. We particularly recommend these rules to the attention of the trade; they are extremely useful, being made with the utmost exactness, and will be found more accurate and convenient than quadrats in casting off matter.

"To ascertain the number of lines in a page, that part of the rule, with the fount on its side with which the calculation is to be made, must be placed lengthways on the matter or printed page, and reversed, in order to know the width or number of m's."

Much pains having been taken by Mr. Stower to furnish, by means of an engraved plate, a scale for this particular purpose, and as the same might be expected in this work, I give the paragraph just as I found it; though I most decidedly object to every argument and recommendation it contains. That it must be very defective every one knows who is aware that founts, nominally the same, vary very considerably; that paper, also, during the several processes of wetting, working, and drying, alters very much its dimensions; so that the work of casting-up printed pages by these rules, unless they were susceptible of all the contractions and expansions that every contingency requires, can serve no other purpose than to create dissatisfaction in the minds of such employers as may happen to make a difference in the calculation per sheet, by the use of these rules, from the price charged, and involve them in disputes with their printers.

The most simple and effective contrivance for casting-up work is, for every printer to set up, in vertical parallel lines, the m's of each fount in his office, with figures in succession beside them, and work them upon good hard paper, but little wet or pressed, and which ought to be dried very gradually. If he cast-up work printed with the same types as these measures, very little variation will be found: for if the measure and the measured page do vary from the measurement of the m's in metal, the one is compensated by the other. But even this method can scarcely be trusted in settling the price with the compositor, since the difference between a thin and thick space will carry an n quadrat, and that may give the turn in the 500 letters, so as to make 1,000 difference. The scheme in the Appendix will exemplify the method recommended, which has been in constant use not only during the long practice of the writer in his profession; but much earlier by those whose knowledge and experience he is ever proud to refer to as forming the foundation of his own.

Of Casting-off Manuscript Copy.

To cast off manuscript with accuracy and precision, is an essential object, but a very unpleasant and troublesome task, requiring great attention and mature deliberation. Much difficulty and trouble are occasioned by copy irregularly written, containing interlineations, erasures, and variations in the size of the paper; to these irregularities the attention must be closely directed, but they will too frequently baffle the best endeavours at calculation. Such a slovenly mode of sending works to press cannot be too much condemned.

The first thing necessary is, to take a comprehensive view of the copy, and to notice whether it is written even, whether it has many interlineations, &c. the number of break-lines, and whether divided into chapters and sub-heads, so that allowances may be made in the calculation, to prevent the plan of the work from being afterwards infringed on. These observations should be entered as a memorandum on a separate piece of paper, to assist the memory and save the trouble of re-examining the manuscript.

This preparation being made, take that part of the copy for calculation nearest the general tendency of the writing, and reckon the number of words contained in one line, previously counting a number of separate lines, so that the one adopted may be a fair average; then take the number of lines in a page, and multiply the one by the other, which again multiply by the quantity of folios the manuscript copy may contain, and thus we are put in possession of the amount of the words contained in the work, with as little loss of time and as much accuracy as circumstances will admit; the necessary allowances should then be made for break lines, chapters, insertions, &c. according to the observations previously made on the memorandum.

If the information has been furnished, as to what sized letter the work is to be done in, and what the width of the page, the measure is to be made accordingly, and after composing a few lines of the manuscript copy, we shall be enabled to form an opinion of the number of words which will come into each printed line; then take the length of the page, generally double the number of m's contained in a single line, and multiply the one by the other, which will produce the information previously gained from the adoption of the same mode on the manuscript page; then compare their results, and if the manuscript drive out, multiply the print by a larger number than the last folio of the writing; and so, *vice versâ*, if the print drive out, we multiply it by a less, until we bring the number of words to agree; the multiplier on the printed calculation will shew what will be the last folio of the printed volume, which being divided into sheets according to the given size of the work, it will be ascertained whether it will bear to be leaded, or the chapters begin pages, &c. or whether it must be made up close, the measure widened, the page lengthened, or the size of the letter reduced.

Should the size of the page and letter be left to the opinion of the printer, with no other order than the number of sheets the work is intended to make, by following the above mode he will be enabled pretty accurately to give his directions—but as it is necessary, on a subject like the present, to be as clear in our observations as possible, we will exemplify what has been laid down. We are supposed to have made our remarks upon the manner of the writing as directed, and we take the number of words in a line of manuscript at 20, the lines in a page at 50; we multiply 50 by 20, which will produce 1,000 words in a page; we then multiply 1,000 by 422, which are supposed to be the number of folios in the manuscript, and we shall find it contain 422,000 words.—The work being printed in pica 8vo, 20 m's measure, and each line containing 10 words, each page 40 lines—the case will stand thus:

Manuscript.	*Printed.*
50 × 20 × 422 = 422,000	40 × 10 × 1,055 = 422,000

Having ascertained the number of sheets the work will make, and that number being sufficient for two volumes, they are divided accordingly. But should the author wish to have his work comprised in one volume, it is requisite to be prepared with the sized type and measure which may accord with his inclination. By referring to the preceding scale of proportions, and placing the brevier by the side of the pica body, we find that a page will contain sixty-two lines instead of forty,* and the same difference in the width, which will be one-half more than the former calculation. We therefore multiply 62 by 15 words in a line, one-half added to the 10 in pica, which will give 930 words in a page; multiply that by 454, it will produce 422,220 words; 454 will therefore be the last folio, should the volume be printed in brevier, which will be 28 sheets and six pages.—In works that are to be leaded, the calculation must be made according to the thickness of the lead in the house in which the work is to be printed, as they are apt to vary; though in general three leads go to a brevier; therefore in a work similar to the foregoing we should add one-third for leads, which will drive it out to 604 pages, or 37 sheets, 12 pages, which is more than a volume generally contains;

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* See the scale of proportion one body of letter bears to another, referred to in p 462.

if it should be thought too much, the measure may be widened and the page lengthened.

Another mode of casting off copy, as given in Luckombe and Stower, shall conclude this article.

" After having made the measure for the work, we set a line for the letter that is designed for it, and take notice how much copy will come into the line in the stick, whether less or more than a line of manuscript. And as it is seldom that neither one nor the other happens, we make a mark in the copy where the line in the stick ends, and number the words that it contains. But as this is not the safest way for casting off close, we count not only the syllables but even the letters that are in a line in the stick, of which we make a memorandum, and proceed to set off a second, third, or fourth line, till a line of copy falls even with a line in the stick. And as we did to the first line in the stick, so we do to the other, marking on the manuscript the end of each line in the stick, and telling the letters in each, to see how they balance against each other. This being carefully done, we begin counting off, each time, as many lines of copy as we know will make even lines in the stick: for example, if 2 lines of copy make 3 lines in print, then 4 make 6, 6 make 9, 8 make 12, and so on, calling every two lines of copy three lines in print.

" In like manner we say, if 4 lines make 5, then 8 make 10, and so on, comparing every four lines of copy to five lines in print.

" And in this manner we carry our calculation on as far as we have occasion, either for pages, formes, or sheets.

" The foregoing calculations are intended to serve where a line of print takes in less than a line of copy, and therefore where a line of print takes in more than a line of copy, the problem is reversed, and instead of saying, if 2 lines make 3, we say, in this case, if 3 lines of copy make 2 lines in print, then 6 lines make 4, 9 make 6, 12 make 8, and so on, counting three lines of copy to make two lines in print. In this manner we may carry our calculation to what number of pages, formes, or sheets we will, remembering always to count off as many lines of copy at once, as we have found they will make even lines in the stick. Thus, for example, if 5 lines make 7, the progression of 5 is 10, 15, 20, &c. and the progression of 7 will be 14, 21, 28, &c.

" In counting off copy after this manner, we take notice of the breaks; and where we judge that one will drive out, we intimate it by a mark of this ∠ or this [shape; and again, where we find that a break will get in, we invert the mark thus 7 or thus]. And to render these marks conspicuous to the compositor, we write them in the margin, that he may take timely notice and keep his matter accordingly.

"We also take care to make proper allowance for heads to chapters, sections, paragraphs, &c. and mention in the margin what depth of lines is left for each, in case their matter varies in quantity.

"In examining the state of the copy, we must observe whether it has abbreviations, that we may guard against them in casting off, and allow for them according to the extent of the respective words, when written out at length."

Each of these modes has its distinct advantage: but, after all, no satisfactory result can be attained, nor bookseller, nor author, be fully aware of the appearance his work will have, unless a specimen page be set up according to the calculation; and then, by a revision of the figures something may probably be produced satisfactory to all parties.

I have never yet seen any means pointed out by which those interested might be enabled to form an opinion upon this matter, without going through the troublesome calculations which have so perplexed all works upon this subject. I have therefore ventured upon the calculation of some tables for this purpose, by which any one may, without further trouble, see the effect of every sized type or page, as compared with another: these will be inserted in the appendix.

Observations on Composing.

HAVING arrived at that part of the work which will be more particularly addressed to the tyro in the art, it will be proper, in the first place, to offer a few observations on the position of the body which he should habituate himself to, on his first introduction to the frame and cases. This does not appear to have been thought of sufficient importance to claim the attention of former writers on the compositor's art, yet so great are the evils which result from beginning with improper position and mechanical habits, that it will require a perseverance rarely maintained to correct them, if once formed.

The most usual results of a want of attention on the part of those under whose care the tyro is brought up, are knock-knees, round shoulders, and superfluous or time-losing motions of the body, head, or arms. More particular mention will be made of these defects in the instruction of a compositor in the progress of this chapter.

The standing position of a compositor should be perfectly upright, without stiffness or restraint; the feet firm on the floor, heels nearly closed, and toes turned out to form an angle of about 45 degrees. The head and body should be kept perfectly steady, except when moving from the roman to the italic case, the operations of distributing and composing being performed by the various motions of the arm, from the shoulder joint alone; and if, to reach a box placed in the further part of the cases, to put in, or take out a letter, he should incline the body by a slight motion, he should immediately resume his erect position. The height of a compositor and his frame should be so adjusted, that his right elbow may just clear the front of the lower case by the a and r boxes, without the smallest elevation of the shoulder joint, his breast will be opposite the space, h, and e boxes. Sitting to his work should only be permitted on particular occasions, and then his stool should be a small piece of board, fastened to a single leg: resting the whole weight of the body upon one leg, while the other foot is on the bottom of the frame, must be strictly avoided, as a deformity of the legs will be the certain consequence; if fatigued by walking previous to beginning work, he should rather take the stool for a short time, than resort to the means above mentioned for relief. There are, undoubtedly, circumstances under which it may be necessary for a compositor to be much on his stool,—lameness, weakness, old age, or other infirmity; but, in the absence of these excuses, an habitual sitter I should call an habitual idler: that which at first going to case may appear fatiguing to the novice, or (which I have much oftener found) to the mistaken apprehension of the parent, habit will render familiar and easy; a perseverance in conquering a little fatigue will be amply repaid by the reflection that it will prevent all the evils of knock-knees, round shoulders, obstructed circulation of the blood, and respiration of the lungs, and though last, not least, habits of idleness.

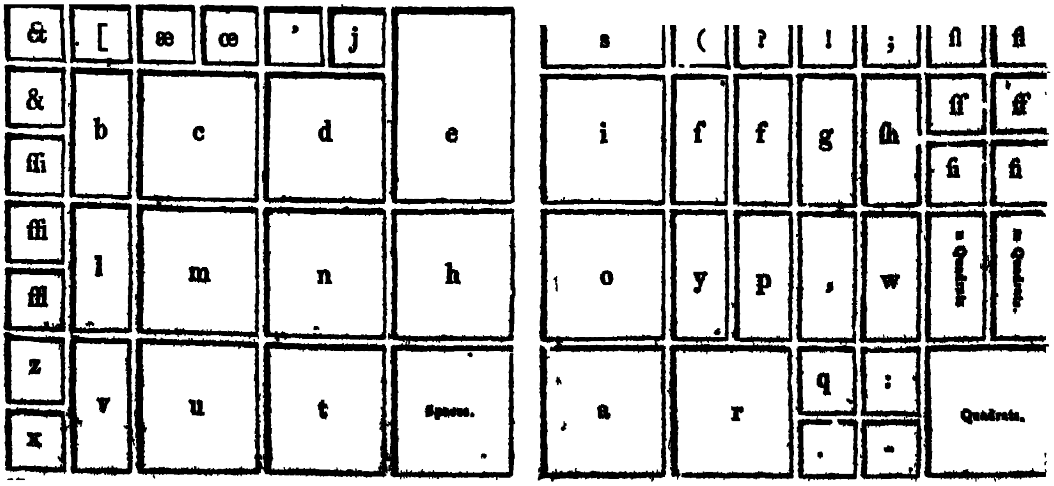
The question still remains undecided with many masters, as to the most proper part of the business that should first engage the attention of the learner; various methods are adopted, each following the mode he thinks best. Sorting of pie is generally the first employment, and afterwards to set it up in lines, which unquestionably gives him a strong insight into the nature of his business, makes him acquainted with the different sizes of type and the method of composing, and prepares his understanding for the comprehension of whatever direction may be given him when put to the case. The next step will be, to teach him the manner in which the type is laid in the cases: this is usually done by furnishing him with a scheme of a pair of common cases upon the plan adopted in the office in which he is to receive his education; there is sometimes a slight variation in different offices, .but the schemes which here follow will be amply sufficient:—

Nos. I, and II.—A pair of cases laid upon the old principle of the double and treble letters dependant upon the long ſ. I have lately seen some works in which this fashion is restored, particularly from the Oxford University Press. It will be a long time before the eye can become familiarized to what has been so long disused, particularly in the case of using two figures to denote the same sound, and still more so when the exploded form resembles another letter so closely, as to be easily mistaken, if in the least imperfect either in casting or printing, so that the reader or speller must be put to the consideration of what the other letters of the word indicate to be its meaning, before they can tell whether it is ſ or f. However, the long ſ has one advantage—it saves a little space; and where three or four sss occur in a close-spaced narrow measure, will frequently prevent the same words coming into the line which the long ſ would have admitted, and this may be of some consequence in Bibles and Prayer Books.

No. I.—UPPER-CASE.

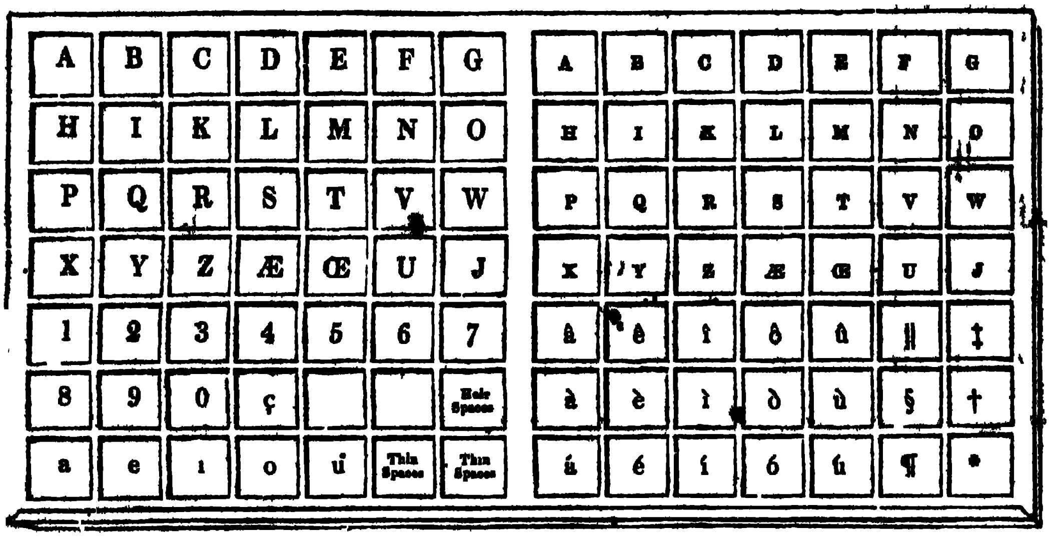
A	B	C	D	E	F	G	A	B	C	D	E	F	G
H	I	K	L	M	N	O	H	I	K	L	M	N	O
P	Q	R	S	T	V	W	P	Q	R	S	T	V	W
X	Y	Z	Æ	Œ	U	J	X	Y	Z	Æ	Œ	U	J
1	2	3	4	5	6	7	â	ê	î	ô	û	¶	‡
8	9	0	ç	Hair Spaces	ſb	ſk	á	é	í	ó	ú	§	†
ä	ë	ï	ö	ü	ſt	k	à	è	ì	ò	ù	‖	*

No. II.—LOWER-CASE.



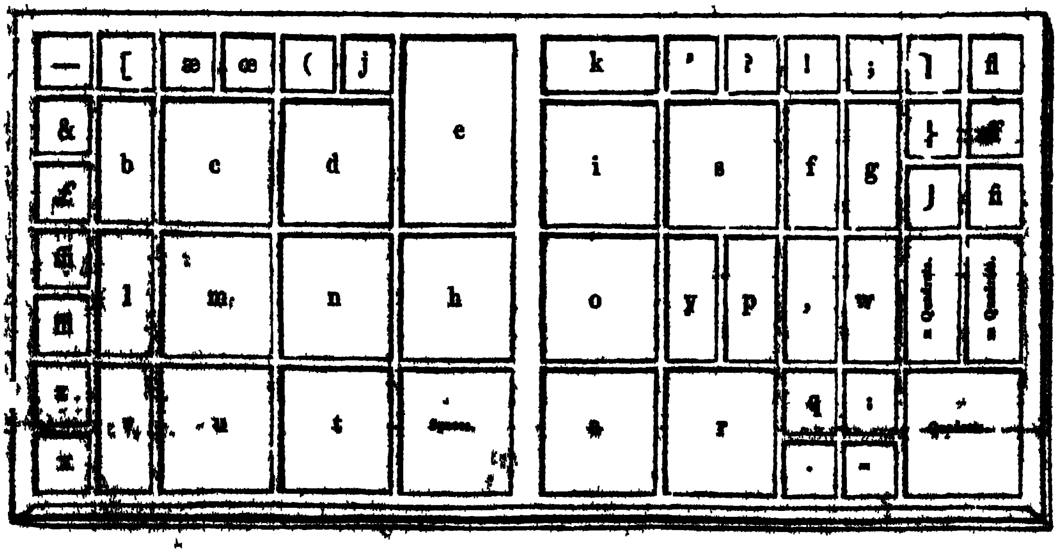
Nos. III. and IV.—A pair of cases without the double, &c. letters, in which the boxes which those sorts used to occupy are appropriated to sorts of frequent recurrence in composing, which formerly were laid intermixed with those of the less frequent demand, as æ œ ! ?, &c. or kept in separate cases. The only alteration in the form of the lower case to suit the round s, was the cutting away the bar betwen the ſ and f, to make one square box of the s, moving the ſ to the place of the g, the g to that of the ſh, and bringing the k from the upper case to the place of the s.

No. III.—UPPER CASE.



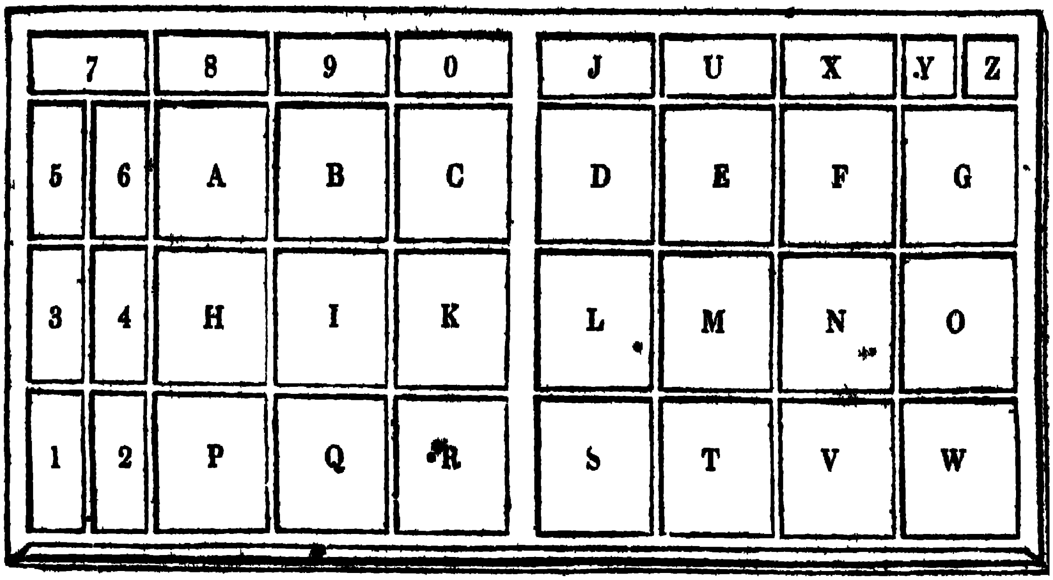
A	B	C	D	E	F	G	A	B	C	D	E	F	G
H	I	K	L	M	N	O	H	I	K	L	M	N	O
P	Q	R	S	T	V	W	P	Q	R	S	T	V	W
X	Y	Z	Æ	Œ	U	J	X	Y	Z	Æ	Œ	U	J
1	2	3	4	5	6	7	â	ê	î	ô	û	‖	‡
8	9	0	ç			Hair Spaces	à	è	ì	ò	ù	§	†
a	e	i	o	u	Thin Spaces	Thin Spaces	á	é	í	ó	ú	¶	*

No. IV.—LOWER CASE—*Present Plan, by cutting out the bar.*



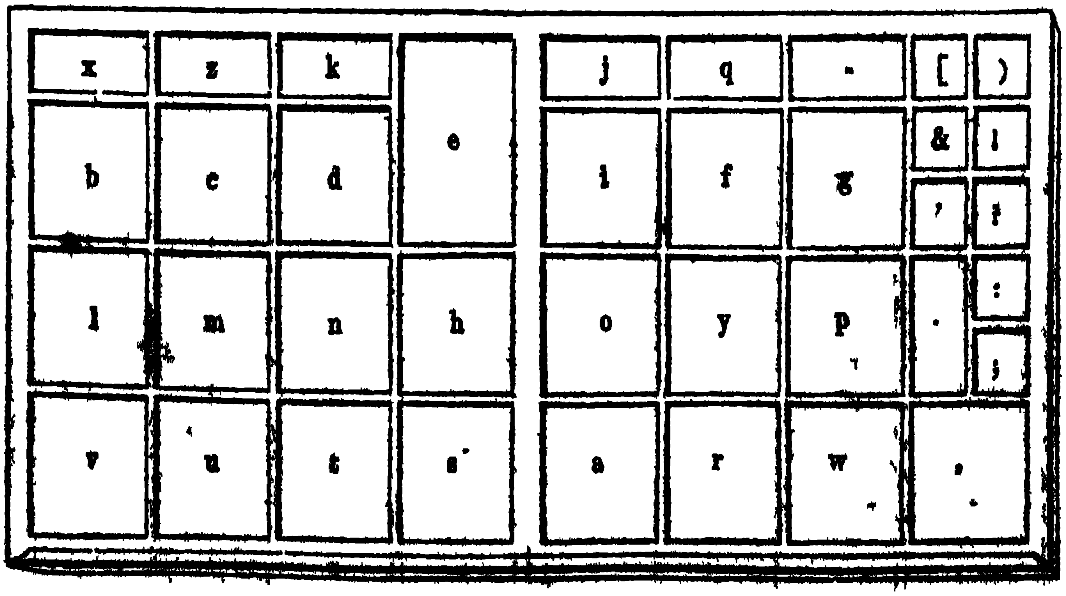
Nos. V. and VI.—A pair of fount cases, in which to deposit the superfluous capitals, lower case, and figures.

No. V.—FOUNT UPPER CASE.



7		8	9	0	J	U	X	Y	Z
5	6	A	B	C	D	E	F	G	
3	4	H	I	K	L	M	N	O	
1	2	P	Q	R	S	T	V	W	

No. VI.—FOUNT LOWER CASE.



x	z	k	e	j	q	-	[	)
b	c	d		i	f	g	& ’	! ?
l	m	n	h	o	y	p	.	: ;
v	u	t	s	a	r	w	,	

No. VII.—GREEK UPPER CASE.

Α	Β	Γ	Δ	Ε	Ζ	Η
Θ	Ι	Κ	Λ	Μ	Ν	Ξ
Ο	Π	Ρ	Σ	Τ	Υ	Φ
Χ	Ψ	Ω	[illegible]	ᾳ	ῃ	ῳ
ϛ	kerned α	kerned η	kerned ω	kerned ᾳ	kerned ῃ	kerned ῳ

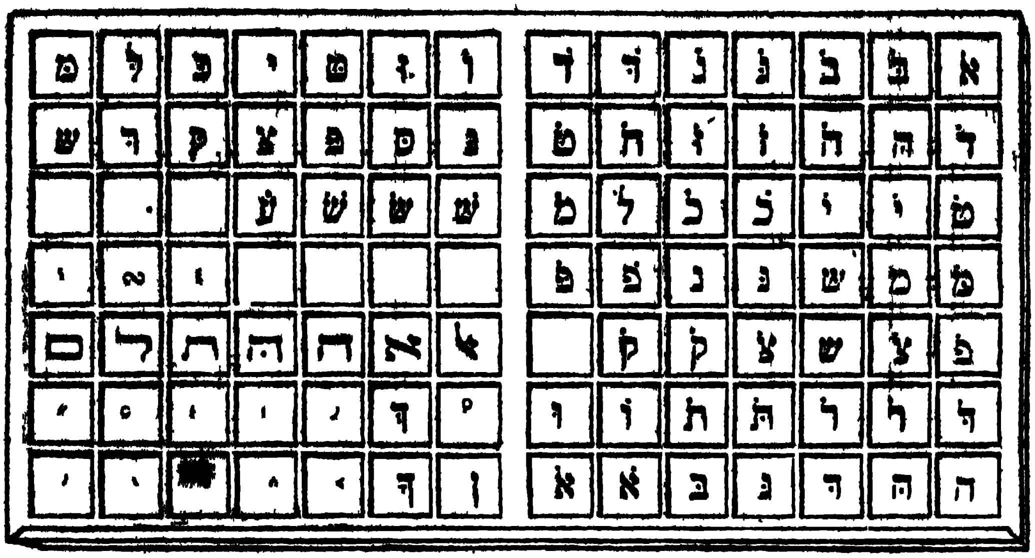
ᾴ	ᾲ	ᾷ	ᾁ	ᾀ	ᾄ	ᾂ	ᾅ	ᾃ	ᾆ	ᾇ			
´	`	͂	̔	̓	῎	῍	῞	῝	῏	῟	¨	΅	῭

ά	ὰ	ᾶ	ἁ	ἀ	ἄ	ἂ	ἅ	ἃ	ἆ	ἇ	α̈	α̈́	α̈̀
έ	ὲ	ε͂	ἑ	ἐ	ἔ	ἒ	ἕ	ἓ					
ή	ὴ	ῆ	ἡ	ἠ	ἤ	ἢ	ἥ	ἣ	ἦ	ἧ			
ί	ὶ	ῖ	ἱ	ἰ	ἴ	ἲ	ἵ	ἳ	ἶ	ἷ	ϊ	ΐ	ῒ
ό	ὸ	ο͂	ὁ	ὀ	ὄ	ὂ	ὅ	ὃ					
ύ	ὺ	ῦ	ὑ	ὐ	ὔ	ὒ	ὕ	ὓ	ὖ	ὗ	ϋ	ΰ	ῢ
ώ	ὼ	ῶ	ὡ	ὠ	ὤ	ὢ	ὥ	ὣ	ὦ	ὧ	ω̈	ω̈́	ω̈̀

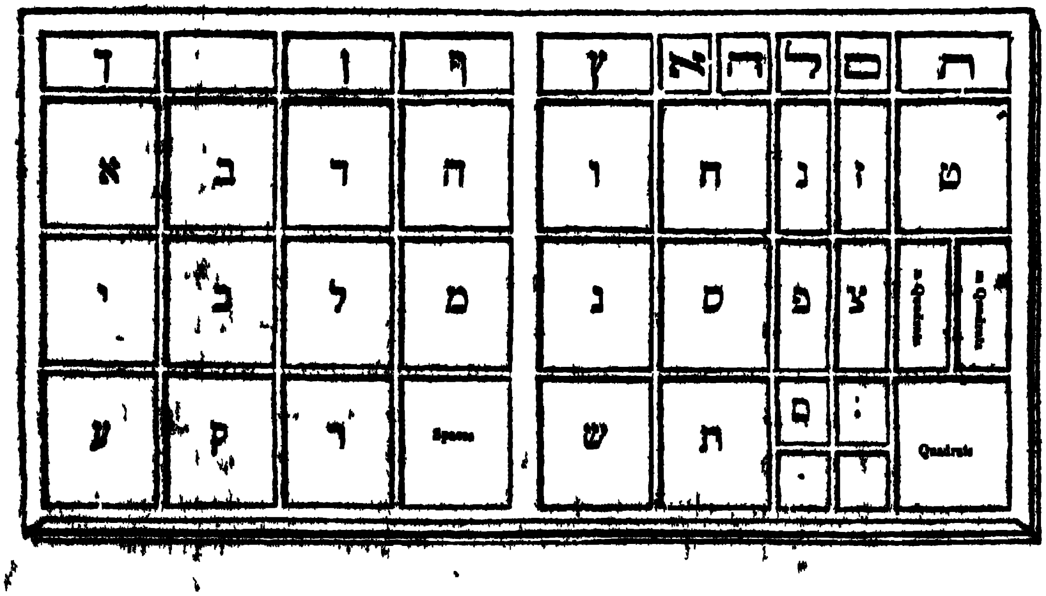
No. VIII.—GREEK LOWER CASE.

				Thin Spaces.	σ	ς	ψ		ῥ	ῤ
ϖ	β	γ	δ	ε	ι	η	ϑ	θ	φ	χ
κ		λ	μ	ν	ο	π	ρ	ϱ	n Quadrats.	m Quadrats.
[illegible]	[illegible]	υ	τ	Spaces	α	ω	,	:	Quadrats.	
							.	-		

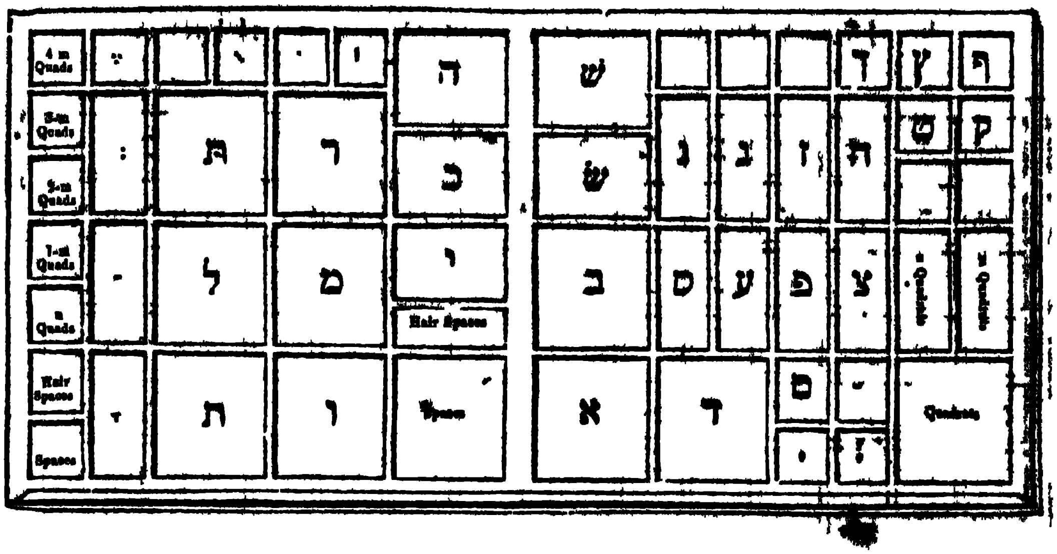
No. IX.—A COMMON UPPER CASE FOR HEBREW.



No. X.—A CASE FOR HEBREW.



XI.—A CASE FOR HEBREW WITH POINTS.



The spaces and quadrats in the boxes on the left-hand side of this case, are for justifying the points.

LORD STANHOPE'S CASES.

In my advertisement to this work, the manuscript of lord Stanhope has been alluded to. It is already known that he had turned his attention to various improvements in printing, and among others, to an alteration in the top of the letter f, which was intended to lead to the rejection of most of the double letters remaining in use, and to the introduction of other double letters, which he proposed to call *logotypes*, that is, word-types. As these could not have been adopted without a new division of the cases, his lordship had also devised what he considered the best arrangement for the purpose. His object in all this was, to facilitate the business of a compositor; and I am of opinion that it would be a decided advantage to both master and compositor were it to be at once generally adopted in all new founts. The plan of the upper-case is particularly eligible.—I am in possession not only of the original manuscript before mentioned, but also of a stereotype plate bearing this imprint, 'Stereotyped by earl Stanhope, Chevening, Kent.' This relic of the Chevening Foundry I have the honour of here presenting to my readers, followed by his lordship's explanation:—

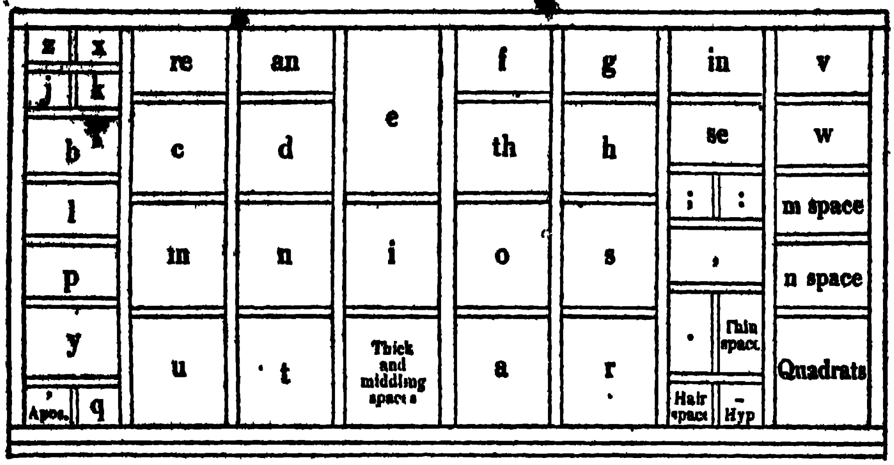
STANHOPE COMPOSING CASES.

UPPER CASE.

					☞	‖	X	Y	Z	1 m dash	2 m dash	J	U
					¶	‡	P	Q	R	S	T	V	W
					§	†	H	I	K	L	M	N	O
X	Y	Z	3 m brace	2 m brace	J	U	A	B	C	D	E	F	G
P	Q	R	S	T	V	W	3	6	9	[ ]	on		!
H	I	K	L	M	N	O	2	5	8	( )	of		&
A	B	C	D	E	F	G	1	4	7	0	to		?

Galley-ledge

LOWER CASE.



PECULIARITIES AND ADVANTAGES OF THESE CASES.

First. The nine logotypes now in use are omitted. They are proposed to be printed with separate types, thus: ff, fi, fl, ffi, ffl, &c. instead of ﬀ, ﬁ, ﬂ, ﬃ, ﬄ, &c. And the Italic thus: *ff, fi, fl,* &c. instead of *ﬀ, ﬁ, ﬂ,* &c. In 20 pages of Enfield's Speaker, (namely, from page 71 to 90, both inclusive,) those logotypes occur only 95 times, viz.

PRESENT LOGOTYPES.

ﬀ	ﬁ	ﬂ	ﬃ	ﬄ	Æ	Œ	æ	œ	Total,
28	51	10	4	2	0	0	0	0	95.

Secondly. Eight new logotypes are introduced. Their regular and frequent occurrence expedite the process of composition in a very considerable degree; for, in those same 20 pages, the new logotypes would save to the compositor no less than 3073 lifts, viz.

STANHOPE LOGOTYPES.

th	in	an	re	se	to	of	on	Total,
771	442	413	385	291	279	264	229	3073.

Thirdly. The introduction of the new logotypes, and the great imperfection of the various existing arrangements of composing cases, have caused the above new and very superior arrangement to be adopted.

Fourthly. The front side of each box of the lower case is made sloping, instead of upright; which shape is convenient both to the view and to the hand of the compositor, and it enables him to lift the types with the same rapidity and ease when the boxes are nearly empty as when they are full. The types are much better preserved from wear, by means of this shape. It also allows the lower case to be made deeper than usual; so that, two of them contain as much as three lower cases on the old construction. At the bottom of each box of the upper case, the internal front area is filled up.

The saving of time is of immense importance, especially in all cases where dispatch is particularly required. The new cases are, by experience, found to save full *one day* out of *six* to the compositor.

Fifteen boxes on the left-hand side of the upper case are represented empty. They are intended for the sorts which are sometimes used for particular works; such as, accented letters, mathematical marks, &c.

As the asterisk, or star, [*] is very liable to be filled with ink at press, it is intentionally excluded from among the reference-marks.

Stereotyped and Printed by EARL STANHOPE, *Chevening House, Kent.*

"I have deemed it advisable to contrive a new pair of composing cases, making a new arrangement of the types in the boxes, introducing a new set of double letters, which I denominate logotypes; and rejecting altogether the double letters ff, fi, fl, ffi, ffl, ſt, ct, formerly occupying room in the cases, but used so seldom that they might rather be considered as retarding than forwarding the work of the compositor.

"My object, in this matter, has been, to afford the best means for the compositor's comfort in composing, combining therewith the greatest attainable expedition. Upon first looking into this part of the business, which naturally fell under my observation, I was forcibly struck with the result of some examinations which I caused to be made, in order to ascertain correctly the frequency of the occurrence of the several different types in composition. Those examinations pointed out, that the double letters ff, fi, fl, ffi, ffl, Æ, Œ, æ, and œ, were so little used in composition as to occupy room in the composing cases unnecessarily; I therefore resolved on getting rid of them; and resorted to the adoption of a slight change in the shape of the letter f, to keep the dot which forms its top from overhanging and being broken off by ascending letters. Man is so much the child of custom, and so much the implicit admirer of fancied beauty, that I believe if the human body generally was very round-shouldered, and if the head projected considerably beyond the chest, it would, in such a case, be deemed a deformity to see a man with an upright body, and carrying his head erect. Having this opinion upon so weighty a subject, I was not surprised to meet with objectors to the proposed alteration in the shape of so humble a servant of literature as the letter f: readers had been so long accustomed to meet her with a downcast head, apparently too weighty to be supported by her feeble neck, that she failed in meeting with a welcome reception in assuming the appearance of strength by carrying her head upright. Let us put the two together. Now I do not say that though the beauty of the letter be diminished by the change, yet that, in consideration of the advantage attendant upon the change, we should reconcile ourselves to it; but I say that, independent of every other view of the matter, the f which I introduce is of a preferable shape, in look alone, to the f which I discard. I can easily conceive that many fantastical flourishes which are given to some letters in old printed books, had their admirers when these books were first published; but it would be difficult for any person now to succeed, if he were to undertake to show their superior beauty, and insist upon their restoration to use. I shall not hesitate in being for once a prophet, and foretel that when the f which I insist upon introducing has become common in books, the f now admired will be condemned solely because of its comparatively inelegant shape.

"I also found in the case certain boxes still retained for the use of other double letters, viz. the ſb, ſk, ſt, ſſ, ſl, ſi, ſſi, and ſh. Within a few years, however, this class of double letters has nearly been laid aside, and it is to be hoped will be completely so, as the much more elegant method of substituting the round s has now universal approbation. Seeing that the disuse of these letters left a considerable portion of the case unoccupied, I proposed another arrangement, so as to fill that part of the case which lay most conveniently to the compositor's hand, with the types which occur oftenest in composition; and to do this the more effectually, I resolved on getting rid also of the double letters which still remained, viz. fi, ff, fl, ffi, ffl. This I accomplish by a slight change in the shape.

"I have said thus much on the f, because it has stood in the way of the improvement which I planned, by occupying with its numerous relatives, considerable portions of the composing cases.

"Although I condemn all the above double letters, as inelegant and useless, as occupying, to the inconvenience of the compositor, a considerable part of the area of composing cases, as loading founts with sorts which sometimes remain new when the fount is generally worn out; as burthening the type-founder with the expense of punches and matrices from which he might be entirely exonerated; yet I am led to view another sort of double letters in just as favourable a light as those appear the reverse. For, by the examination which I directed to be made, I found that in 20 pages of Enfield's Speaker (namely, from p. 71 to 90) all the double letters which I proposed to exclude occurred only 95 times; whereas, I found that in the same 20 pages, the letters *th* occurred together 771 times, *in* 441, *an* 413, *re* 385, *se* 291, *to* 279, *of* 264, and *on* 229; making a total of 3073 lifts saved to the compositor. This decided me that those logotypes should be introduced into the new plan of the composing cases; and, after due deliberation, I fixed upon the following as the most advantageous mode of arrangement:

"It will immediately strike the eye of an intelligent printer that there are other alterations from the common arrangement, besides what were rendered necessary by the exclusion of improper double letters; he will particularly notice where I have put the capitals, the small capitals, and the figures; in the arrangement of all which I believe I have been swayed by the clearest conviction and soundest reasoning. I have put the first row of capitals in the front of the case, instead of being at the very back, continuing them backwards, and terminating them, as formerly, in the middle row. There appears to me to have been something so extremely absurd in beginning them at the back row of the case, that I wonder the compositors did not consult among themselves and apply to their employers for permission to make another arrangement. I am informed, but I should suppose so without such information, that frequent accidents occur to compositors when they have to pull out of a rack the upper case, to get to the sorts contained in it. Why has not this long ago induced another arrangement? It is exceedingly wonderful, that the experience of misfortune should not have led intelligent persons to a remedy so evident and so very beneficial to themselves. I propose this, as well as the other changes in the case, with perfect confidence that, when adopted, I shall have the thanks of every compositor who shall contrast and reflect upon the difference of arrangement.

"In my new upper case I have put a galley ledge over the third row of boxes. I do not propose putting the galley, as usual, towards the right-hand end of the case, for I occupy that neighbourhood with useful sorts, that is, sorts which may be often wanted in composition; but I propose placing the galley on the left-hand side of the case, which I therefore represent as empty boxes, leaving them to be filled when occasion requires, with accented letters, or other unusual sorts. This quarter of the case is evidently that which requires the most awkward motion of the compositor, if he has occasion to go there to take types out of the boxes, and therefore the most proper to be generally left unoccupied with types. I consider the figures to be fully as well arranged as formerly, easily to be remembered, and better placed in being so compactly together. The small capitals undergo the least change as to arrangement; this is, however, clearly improved, inasmuch as their first row, that most used, is entitled to be brought nearer to the compositor than the last three letters of the alphabet, which are, in comparison, so little used."

OF CASES AND FRAME.

An upper case and a lower case, together, make what is technically called "a pair of cases." [See page 407.] They are each made similar as to length, breadth, and depth; viz. 2 feet 8½ inches long—1 foot 2½ inches wide—and, generally, 1⅛ inch deep. The outer frame of each case is about three-quarters of an inch broad, in order that the ends of the several partitions which form the cells, and which are made of more slender strips of wood, may be let into its substance. The hithermost side is about half an inch higher than either of the other sides, so that when the galley, or another pair of cases are set upon them, they may rest against that higher ledge, and not slide off. Both the upper and lower cases have a partition, one inch broad, dove-tailed into the middle of the upper and under rail of the frame, to divide each case into two equal rectangles; and grooves are made on each side of it, to correspond with certain other grooves in each end, in order to admit the ends of those partitions which divide the cases lengthways: and the bottom board is well nailed to this partition as well as to the outer frame of the case. The pieces or strips of which the several cells are formed, are about the thickness of an English body. Each half of the whole length of the upper case is divided into seven equal parts; and its breadth containing also seven like divisions; the whole upper case is consequently divided into ninety-eight square boxes, whose areas are all equal to one another. But the two halves of the lower case are divided in length into eight equal parts, and its breadth into seven; but instead of the partitions being continued throughout, as in the upper cases, there are four several sizes of boxes, so arranged that the largest may be conveniently seated for the compositor's hand, because the European languages run most upon the particular letters to which the large boxes are appropriated. The number of boxes in the lower case is fifty-four, the arrangement of which will be at once exemplified by the schemes of cases; and the engraving in p. 408, will show the manner in which, when used, they are placed on

The Frame,

of which no further description than a reference to the engraving, p. 408, will be necessary to enable any joiner to make one.

The Galley

is a simple instrument made of three-eighths inch board, generally mahogany, with two elevated sides, not quite so high as quadrat height; their size varying for octavos, quartos, folios, &c. In the engraving, p. 408, there is one represented lying upon the bottom board of the frame.

The Imposing Stone

is made of marble, Purbeck, York, or any other stone that will take a flat and smooth face: the harder it is the better; and therefore marble, possessing this quality in a greater degree, and its pores being closer, is preferable to either of the others. It should be mounted upon a strong frame, and bedded with saw-dust, plaster, or paper; and its face should lie about 3 feet 2 inches above the floor. The frame under the stone is commonly fitted up with draw-boxes to contain quoins, reglet, furniture, lead, &c. &c. The usual size of the stone is 4 feet 8 inches, by 2 feet 3 inches, those dimensions being sufficient to hold a sheet of royal.

Letter Boards

are of an oblong shape, 2 feet 2½ inches long, by 1 foot 10 inches wide, and 1¼ inch thick, for demy—for royal, 2 feet 4 inches long, by 2 feet wide. The upper side is planed very flat and smooth; and the under side is clamped with pieces about two inches square, dove-tailed into the board cross-ways, about four inches from each end, as well to keep it from warping as to bear it off the stone or bulk; or to admit of one board standing over another without touching the letter which may be upon the under ones.

Furniture, Quoins, Reglet, Scaleboard, &c.

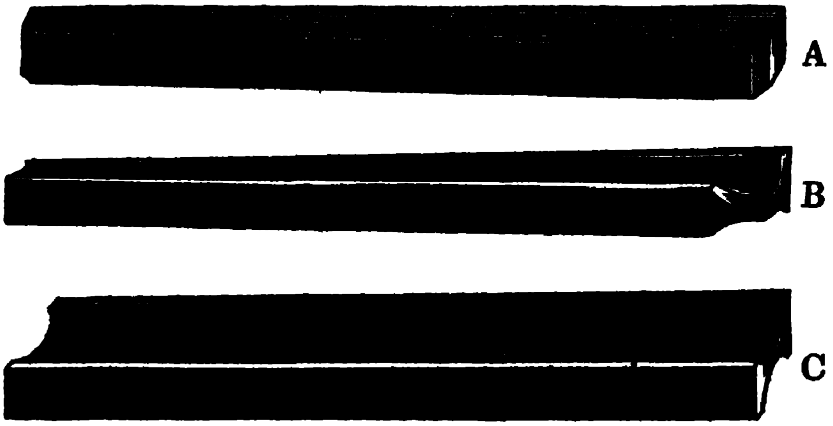
includes head-sticks, side and foot-sticks, gutters, back-sticks, reglets, quoins, &c. which are made with dry wainscot, quadrat high. The gage of the furniture is by quotations, beginning at narrow-quotation; then broad-quotation; broad and pica; double-narrow; double-broad; &c. &c. All below narrow-quotation is named by body of letter; as, two-line great primer; two-line english; english; and down to pearl; which is followed by scaleboard of two kinds, thick and thin. All furniture and reglets are supplied by the printer's joiner, in lengths of a yard each, by the dozen yards.

Side-Sticks

are the fixed wedges to lay against the sides and feet of the pages when they are about to be made fast in the chase, as mentioned in the general description, p. 412. They are usually made with, from three-quarters to an inch, shoulders; the sharp angle is generally taken off from the bevelled ends: and both these and quoins are made to about quadrat height. The wear of side-sticks is so great from continual locking-up and unlocking, as to have induced the experiment of using metal ones. Brass has been tried for the purpose, but it proves too soft and expensive; and cast-iron is found too heavy. In order to obviate the main objection against the use of the latter metal, I have had recourse to grooving out the upper and under sides of the stick until the hollows nearly meet at the larger end, passing gradually towards each surface at the smaller point; the face, or that part which lies in contact with the type, being filed perfectly flat, they are found to answer many valuable purposes, and are calculated to save expense. The engravings will, I think, serve to explain what is meant in this description, as well as what I have to state concerning

The Gutter,

which is made after the same principle, and still further lightened by two entire perforations of considerable length. It will be evident to those at all acquainted with the art, that the iron furniture can only be applied to works of a regular size: and perhaps it is to large demy octavos and royals that they are most particularly appropriate, as the wood, when used in works of this nature, will soon, by the immense pressure at one time, absorption of lye and water in washing and laying up, then lying loose to dry, imposing again, and going again and again through the same routine, cause a defect in register—in the running heads —in the sides of the pages, and in the exact parallelism of the lines—which can never happen in a judicious use of the metal furniture.



A, is the common wood side-stick; B, the improved hollow iron one; C, the improved hollow gutter.

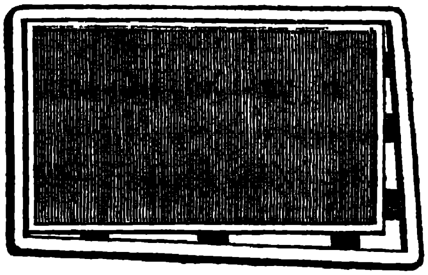
Quoins.

I still make use of wooden ones; and think, if they are properly used, no substitute is wanted. They are the moving wedges that fasten up the pages in a chase; and upon the manner in which they are used, chiefly depends not only the safety, but also the fair and straight standing of the matter in a forme. Their shape is irregular, having three of their sides truly squared, and the fourth slanted or bevelled to correspond with the degree of inclination or slope of the side-stick against which they are to act, the square side of the quoin running against the parallel side of the chase as the other presses the side-stick, when the shooting-stick is applied to the end to force them forward to a proper tightness. This peculiarity of shape will excuse the giving an engraving of what may, at first view, appear a trifle.

Chases.

A chase may be described as a rectangular iron frame, for containing the pages which form one side of the sheet. The usual size for demy is about 2 ft. 2 in. long, by 1 ft. 9 in. broad, the rim being three-quarters of an inch wide, by five-eighths of an inch deep, and set so flat as to bear equally upon the imposing-stone on all the sides and angles; the inside requires to be filed perfectly straight, square, and smooth. There are two cross-bars to every perfect chase, called the long and short crosses: the short cross is about three-quarters of an inch in width; the long one, three-eighths of an inch. A dove-tail, filed away upon a bevil, from the under to the upper side, forms each end of these crosses, so as to make the under side of each dove-tail narrower than the upper side. These dove-tails are fitted into four dove-tail mortises filed in the rim, each of which divides its side into two equal parts upon the inside; and each is made wider on the upper side than on the under, so as to fit the corresponding dove-tails of the crosses, and prevent them from falling through to the lower side. Similar mortises are also made about 2½ inches from those in the long sides of the chase; and also, 2¼ inches from those in the short sides—the former for shifting the short cross for imposing twelves; and the latter for shifting the long cross for imposing eighteens. As the crosses when placed in the frame must intersect each other in which position soever they are put, one is lapped into the other by notches filed half through each, at such points as correspond to the mortises in the rim, and so that they may stand precisely at right angles one to another, at either place of intersection. In the middle, between the two edges of the upper side of the short cross, are made two grooves, parallel to the sides, beginning at about two inches from each end, and extending to about five inches in length towards the middle of the bar; which grooves are about a quarter of an inch wide, and about three-eighths deep; and are made to receive the points from the tympans. A chase cut for twelves and eighteens, as thus described, is represented as standing against the bulk end of the frame, p. 408.

Chases made purposely for broadsides have no crosses or dovetail cuts, but must be broader in the rim to give all the resistance possible to the locking up. For a work of unusual dimensions, where it was necessary to contrive every possible means for gaining room even upon a double-demy press, I devised a plan for saving both the space, weight, and expense of side and foot sticks (which for such a purpose must have been made of iron), by forming a chase having two sides of irregular angles, the other two being at right angles, so placing only a reglet for the quoins to run against; the irregular sides of the chase forming the inclined planes to give the pressure against the type; which the following diagram will better explain.



The Shooting-Stick

is made of box-wood, which is the only material yet found sufficiently hard and tough to endure the action of the mallet and quoin, with the least injury to either; and, which is of still more consequence, causing the least damage to the imposing-stone. Its form is that of a perfect wedge, about one-and-a-half inches broad, and eight inches long; its thickness at the top being also about one-and-a-half inches, gradually declining to the lesser end, at which its thickness is about half an inch. The rapid wear of shooting-sticks made of box-wood, has induced the frequent trial of iron as a lasting substitute: but the still more rapid wear occasioned by this material to the quoin, mallet, and stone, has more than counterbalanced the advantage in durability of iron shooting-sticks. Still, it is frequently necessary in order to unlock the small quoins when driven up to the top shoulder of the side-stick, to use a sharper point than any box-wood shooting-stick can well be dressed to, or retain after a day's wear. For this purpose, and to remedy the inconveniences above mentioned, I have one at each stone made with a brass toe, and a socket to admit the box handle. Two angular notches are cut in the toe, having a projection between them at such a degree of angle as to catch the quoin at right angles on its top and side; the whole shooting-stick being held in the usual position for the action of the mallet: and one side of the toe is filed away, at its side, still more than the other, to admit of its encountering the smallest description of quoin; all which will be seen illustrated in the engraving.

The Planer

is of beech, grooved in each side for the more sure handling by the compositor.

Shears, Sponge, Bodkin, Page-cord,*

are each equally necessary, but can need no description.

Brass-rule

is another essential article of consumption in every printing-office. This is usually supplied, ready cut to type height, and bevelled to a fine sharp face, by printer's joiners; although some smiths have of late years pretended to be *superior* makers of this article. It is furnished in lengths of sixteen inches, at per dozen lengths. It is cut out of rolled sheet brass of various thicknesses: but the usual substance, when orders are not particularly given, is a sheet 4 feet 2 inches, by 16 inches, weighing 8lbs., from which it increases to sheets of 10lbs. 12lbs. &c. It is a very delicate article to face properly; and may be had single-face; double-face, which usually has one thick line and one thin; or treble-face, of any required thickness; as minion, nonpareil, brevier, long-primer, &c. The vertical lines in table-work—lines across the heads of pages—short double lines to divide or ornament the pages—engraved ornament rules—and all similar insertions, are made with brass-rule.

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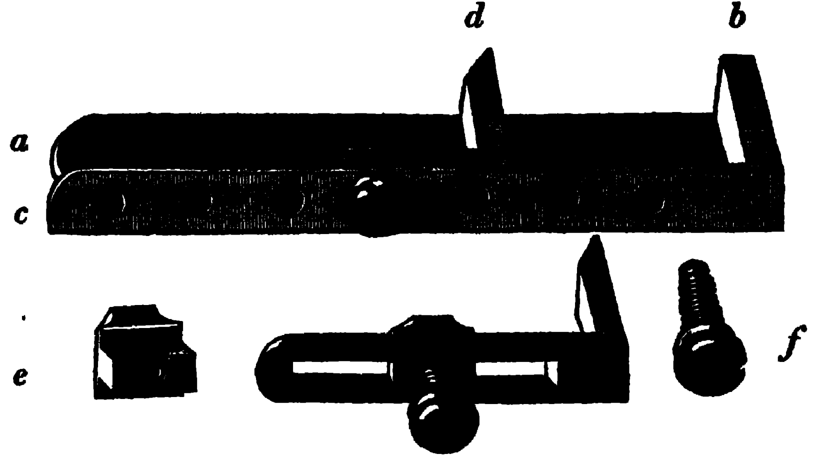
* See the representation of one sticking on the frame, p. 408.

A Composing-Stick

is the only instrument or tool with which a compositor has to provide himself at the outset; and which, with due care, will last him the whole of his life. To make this little instrument quite perfect requires a great deal of mathematical nicety: I shall therefore mention a few of the usual defects in order to give the printer a better opportunity of directing an artist to execute the instrument perfectly.



[illegible] is the plate, which is of polished plate-iron, brass, or bell metal, usually from seven to ten inches long, and from one-and-a-half to two inches wide; *c* is the flanch, turned up from the plate at right angles, and is five-eighths of an inch high above the plate, through which are holes at about an inch distance from each other to receive the screw; *b* is the head, which is the same depth as the flanch, but much stronger, fastened by rivets, dove-tails, or brazing, to the plate and flanch; *d* is the slide, having an opening in the lower leg, or part which rests against the flanch, to admit the tenon of the nut *e*, which is shouldered to fit into its groove; and which nut is to receive the screw *f*, on its being passed through one of the holes in *c*, to fasten the slide to any measure; which is done by means of the groove in the slide being moved backwards or forwards on the screw and nut, and by the screw being used at the hole convenient to the required distance, so as to set the slide at the point wanted from the head *b*.

The most usual defects in this instrument are in the slide and head not being perfectly square to each other, and each to the plate. Where this occurs in the distance from *d* to *b*, it will be evident that the lengths of the lines composed will vary: that is, the first line and last line in the composing-stick will not be exactly equal in length to one another as they ought to be. This is technically called the *justification* of the lines: and if this is defective, every *stickful*, as emptied in the galley, will present unequal pressure to the furniture; and which scarcely admits of a remedy when once *set up*. Another defect in the slide and head often occurs from their not being square, or at right angles to the flanch at the back of the plate. This makes it extremely difficult for a compositor to justify with any precision, and causes the matter to hang in the stick when he empties into the galley. Indeed, so very nice is the workmanship required to be in the construction of every part of a composing stick, that a fall from the cases, or other accidents, may have so deranged it as to render it unsafe for proceeding on with the work for which it was in use, without the compositor *trying his stick*, by replacing in it a few lines of the matter last composed.

The young compositor having made himself thoroughly acquainted with the cases, and with the face and nick of the letter, that he may be capable of distinguishing the difference between the b and the q, the d and the p, the n and the u, &c. he is generally put to composing, the person under whose care he is brought up working by his side, in order to give him immediate instruction.

It would be departing from the customary routine, if the subject of composing were here considered; it shall, therefore, be introduced in its more proper place, and give room to some observations on the method of

Laying of Cases.

This implies filling them with the sorts of a new fount of letter.

Being provided with fount cases (plans of which, according to the improved mode, are annexed), the weight of the fount is ascertained, and a number of cases filled according to its extent. Each box should be moderately filled with its proper sort; the fount case may then be supplied, and what remains over put into coffins, and placed away in baskets, or any other convenient receptacle, to be ready when wanted.

New letter being more liable to stick, after being wetted, than any other, should be sprinkled with strong soap water, which has been found to answer the purpose of preventing this unpleasant circumstance.

The advantage resulting from the improvement in the fount cases, must appear obvious. The old plan was attended with many inconveniences; the boxes being deep, it became difficult to get the sorts out of the smaller ones, and not being much longer or wider than the common cases, the difference in depth did not allow sufficient room for the superfluous sorts.

By making the fount cases longer and wider, the boxes are enlarged, and as spaces and quadrats are kept in drawers, and the long ſ being now generally exploded, the parts allotted to their use in the fount case may be otherwise appropriated.

The capital fount case is differently constructed; it but seldom occurs that either small capitals or accented letters require more room than the common cases supply, therefore, it is only necessary to provide a case capable of containing the capitals and figures; a common-sized case will answer the purpose, with this advantage, that the boxes being larger contain not only a greater number of each sort, but are more readily taken out than in smaller boxes.

Of Distributing.

As the disposition of sorts differs almost in every printing-office more or less, it follows, that such irregularities must have their natural effects; of which we do not want for instances. The first that offers itself to our observation is the loss which a compositor sustains every time he changes his place of work; for, being unacquainted with the situation of each sort, he cannot distribute with his accustomed facility and despatch—an inconvenience which might be easily prevented were establishers of new houses to follow a uniform method.

Other evils result from this want of uniformity, which particularly affect the master. Some compositors, rather than charge their memory with the different situations of particular sorts, transpose them into such boxes as contained them at their last place of work, and the transposed sorts not being replaced, the boxes become receptacles for pie; for the right sorts being distributed at top, the undermost are rendered useless, because they are not expected to lodge in quarters that were not assigned them; therefore, if the hidden sorts happen to run short, they must be re-cast.

It would be the means of preserving a pair of cases clean, were they filled and provided with letter for a new compositor to begin his work upon, that, by composing first, he might acquaint himself with the contents of his boxes, and be the better prepared for distribution; but as few compositors feel inclined to quit the beaten track, and as a difficulty would occur in compelling them to leave the cases as they found them, or if they did leave them full of letter, they might distribute it carelessly, knowing they would not have to set it out again, the evil might be still far from being remedied; therefore, those masters who take upon themselves the responsibility of deviating from general plans, must abide by the consequences that inevitably follow.

The foregoing observations, however, apply with much force to the impropriety of permitting a young beginner to distribute before he has made himself acquainted with the boxes, as well as the letters, which he cannot acquire in a more ready manner than by first learning to compose.

He should be cautioned not to take up too much matter at a time, for, should he break his handful, he will have the more pie to clear. Even to those who are not likely often to meet with this accident, the caution is not unnecessary, as too great a weight weakens the wrist, and it is a mistaken notion that it gains time, for if one handful fall into the case, the time lost one way will be more than equivalent to the time saved another. When the accident does take place, the pie should be cleared away before any thing else is done.

In taking up a handful, the head of the page should be towards the distributor, which prevents the trouble as well as danger of turning it round, in order to have the nick uppermost. So much matter should only be taken up at a time, as can be conveniently held in the left hand, and not to be higher than the thumb, which guards the ends of the lines from falling.

He should be careful not to throw the letters into the case with their face downwards, as it batters them; neither should he distribute his case too full, for it invariably creates pie.

He should not be impatient to acquire a quick method at first; his principal study should be propriety, though his progress be slow; that attained, expedition will follow from practice, and he will find his advantage in composing from a clean case, though he may be longer in distributing it. A man loses double the time in correcting that he imagines he saves from quick distribution.

With many compositors much time is unnecessarily lost in looking at the word before they distribute it. By proper attention in the learner he may avoid this, and become, without the appearance of hurry, an expeditious as well as clean distributor. To attain which, we would recommend him never to take more letter between his fingers than he can conveniently hold, and, if possible, always to take an entire word; to keep his handful on an inclining position, so that the face of the letter may come more immediately under his eye. By proper attention and practice he will become so completely acquainted with the beard or beak of the type, as to know the meaning of the word he takes from his handful, with the cursory view he may have of it, while in the act of lifting it.

It is to this method that so many in the business are indebted for their expedition and cleanness in distribution; though to an observer the movement of their hands appears but slow. It is not to velocity of movement that compositors are indebted for their expedition, either in composing or distributing—it is to *system*, without which their attempts may have the appearance of expedition, but produce only fatigue from anxiety and false motion: therefore, to system we would particularly call their attention, and as clean distribution produces clean composition, which not only saves time at the stone, but acquires them a respectable name, they cannot be too attentive to that part of their business.

Another material point before distributing is the well laying up of the forme. In this particular many compositors are shamefully remiss, and from this negligence arise inconveniences by which they lose more time than if they had taken the first trouble, besides the unpleasantness of working with dirty letter.

The letter-board should always be kept clean, and the bottom as well as the face of the forme well washed before it is laid on the board and unlocked, for if any of the dirt remain from the lye brush after it is unlocked, it will sink into the matter instead of running off. This precaution taken, the pages should be well opened, and the whole forme washed till the water appears to run from it in a clean state. A forme cannot be well laid up without plenty of water. If the forme appears particularly dirty, it is best to lock it up again, which works out the filth; then rinse the bottom of it and proceed as before. The letter once washed perfectly clean, by care may be kept so afterwards with little trouble.

Many compositors keep a piece of alum in their cases, in order to contract the grain of the skin of their fingers when distributing slippery letter; this is a declaration of their want of cleanliness, for had they washed their letter properly, it would not be slippery.

It is sometimes necessary to dry the letter at the fire after distributing; it is particularly recommended not to use the letter after it is in this way dried till it is perfectly cold, as very pernicious effects arise from the antimony, which the heat of the fire brings into action, when joined to the tender particles of the skin; nor to stand near the case, either while at the fire, or until completely cool. The noxious vapour which arises is so easy to be perceived that it must alone be sufficient warning of the effects: it is the only part of the business that has any thing injurious to health, and being entirely at the choice of the compositor, he, for his own sake, ought always to avoid it as a pestilence, which will equally affect his respiration and his sinews, by the former instantly affecting his lungs, and the latter causing contractions of the fingers. It is always better, where it can be conveniently managed, to distribute at night, or before meals, so that the letter may dry without artificial heat.

Of Composing.

COMPOSING is a term which includes several exercises, as well of the mind as the body; for when we are said to compose, we are at the same time engaged in reading and spelling what we are composing, as well as in taking care to space and to justify the matter. But that we may observe some method in our remarks, we will begin with what immediately precedes the composition.

When the copy of a work is put into the hands of the compositor, he should receive directions respecting the width and length of the page; whether it is to be leaded, and if with white lines between the breaks; and whether any particular method is to be followed in the punctuation and in the adoption of capitals. If the copy be a re-print, he will observe whether there be any difference between the type he is about to use and the copy, so that his spacing may not be affected, against which he must take the necessary precautions at the time, by widening or lessening his measure, if solid matter, or driving out or getting in each paragraph, if leaded. He should select a close-spaced line from the copy, which will at once prove the variation, if there be any. These instructions being given, the compositor will make his measure to the number of pica m's directed, which is done by laying them flat-ways in the composing stick, and then screwing it up, not too tight, as that is apt to strain it, nor so slack as to allow the measure to give. He then fits a setting rule to the measure, and his case being supplied with letter, he is prepared for composing.

It is necessary to observe that all measures are made to pica m's, though the work may be printed in a different sized type; and that all leads, &c. are cast to pica m's, which standard being abided by, leads can always be kept for any measure.

Having taken notice of the state of the copy, and received his directions, the compositor begins his work; and here we would particularly call his attention to those rules by which he may compose with accuracy, ease, and expedition. As we before observed, an ill-habit once acquired is with difficulty shaken off. The variety of motions exhibited by some compositors are truly ludicrous; such as nodding the head, agitating the body, throwing out the arm, ticking the letter against the case or the setting rule, with many other false movements, which not only lose time, but fatigue the mind and exhaust the body. The swift movement of the hand is not the criterion of a quick compositor. A gentleman, some few years back, not a professed printer, though the proprietor of an extensive printing concern, gave orders to his overseer to discharge a compositor who had not the appearance of moving his arm so quick as others in the office with him; but his overseer was able to convince him that this man was not only the neatest, but the most expeditious, and, consequently, the most valuable, man in his employ.

In composing, the left hand, which contains the stick, should always follow the right, which takes up the letters. If the left hand remain stationary, much time is lost in bringing each letter to it, and traversing a greater space than necessary; the eye should always be fixed on the nick of the letter, before the finger is ready to take it up; this will effectually prevent any false motion, as it may be lifted and conveyed to the stick in its proper position. A sentence of the copy should, if possible, be taken at one time, and while putting in the point and space which concludes that sentence, the eye is at full liberty to revert again to the copy for a fresh one. It is to perfection in this particular that those compositors who are so much admired in the business are indebted for their swiftness. The time they gain is considerable, without any appearance of bustle or fatigue. By thus taking into the memory a sentence at a time, they preserve the connexion of their subject, which renders the punctuation less difficult.

From habit the compositor becomes so well acquainted with the peculiar feel of each type, that he can generally detect a wrong letter without looking at it. Those who are careful in distribution, find the advantage of it in composition. The greatest disgrace that can attach to a compositor is that of being considered a foul or slovenly workman—to avoid which should be his earnest endeavour; it would be even better to read every line as he composes it, than to lose so much of his time at the stone, independent of the disgrace attached to a man of this description. We would recommend him to cast his eye over the line as he justifies it; this method, properly acquired, will not detain him in his work, but will enable him to be much more accurate.

Uniformity in spacing is an important branch of the compositor's business, requiring care and judgment, and ought to be particularly impressed on the mind of the young beginner. Close spacing is as unpleasant to the sight as wide spacing, and ought never to be allowed except in very narrow measures; and frequently, even then, with care, it might be dispensed with. What is commonly termed the thick space, which is one-third of the body of the type, is the best and proper separation between each word; though this cannot always be adopted in narrow measures, with large letter. It is not merely necessary to have a line here and there uniformly spaced—a careful compositor will be anxious to give to every page that uniformity of appearance which is one of its chief excellences. Careless and foul compositors will never preserve this desirable uniformity; for when their proofs are crowded with corrections, the utmost care in rectifying those blunders will not make the spacing regular. We must therefore press on the mind of the young beginner this important maxim—That it is better to do little, and to be determined to do that little *well*, than to be anxious to put together a great number of letters, without any regard to accuracy and uniformity. Authors should send their copy, *finally* corrected, to the press;* for when alterations and additions are made in the proof sheet, it becomes difficult, where there are few paragraphs, to make the spacing equal.

Many compositors, in correcting, do not overrun the matter, as they ought to do, in the stick, but on the stone, and frequently hair-space or treble-space a line, in order to get in or drive out a word; when, by overrunning a line or two, forward or backward, they might preserve uniformity.

The different sized spaces in a fount of letter have been already noticed; it is only necessary to observe here, that the n-quadrat and hair-space should be kept apart; the others, viz. the thin, middling, and thick spaces, are generally mixed together, as there is less trouble in justifying by taking them up at random, than when they are all kept separate; for should there be occasion to alter a thick space to the middling, or *vice versa*, it may be necessary to change them all, in order to make the line even, when, by taking them up as they occur, there is the greater chance of justifying the line regularly, with the least loss of time.

Where a line is even spaced, and yet requires justification, put the additional space between those words of the line where it will be least observed, viz. between a d, and an h, which being perpendicular letters, will admit of the addition, but not in a greater degree than a middling and thin space to a thick-spaced line; or, after a kerned letter, the beak of which may bear upon the top of a perpendicular, as the f and the h.

The same rule should be observed where it may be necessary to reduce the spacing of a line: less space is required after a sloping letter than a perpendicular one, and even after a comma; though in regular spacing all points should have an n-quadrat after them, except the full point, which should have an m-quadrat, as terminating a sentence.

Spaces are cast to such a regular gradation, that no excuse can be offered on the part of the compositor for irregular spacing.

Having made these preliminary and most essential remarks, we shall proceed. Should the length of the page be left to the discretion of the compositor, he sets so many lines as he conceives a fair proportion, which is generally considered as double its width, then places the head and direction line (if any) to it, and cuts an exact gauge. This is done before he makes up the first page, as that will vary according to the different founts there must necessarily be in it.

Head-lines are generally set in small capitals of the same fount, or in italic. Capitals of letter about two sizes smaller than the body of the work, with folios of a larger face, have a much neater appearance than either of the foregoing. If only folios are placed at the top of the page, it is better to make use of full-faced figures, a size or two larger than the work, without parentheses or crotchets.

Direction words at the bottom of the page are now generally disused; the omission of them does not injure the appearance of the work, but saves time and expense where overrunning occurs in the proof; nevertheless, in making up the page, it is necessary to substitute a white line for holding the signature, volume, &c. Also, in twelves and eighteens, two white lines should be added to the page, one for the signature and the other for convenience, in case of outs or additions from the author; but it should be observed, that the extra white line must be allowed in the gauge of the furniture, but not cast up in the price of the page.

Compositors formerly experienced much trouble and loss of time in making up the first page of a work, by introducing heavy head-pieces formed of different-bodied flowers. This taste for flowery decorations is deservedly exploded, and it is now only necessary to set the title of the work in a neat type. The setting of titles must depend on the fancy and ingenuity of the compositor, under general directions from the master, and therefore no fixed or certain rule can be laid down for this purpose.

The compositor will also receive directions, when there are notes, what letter they are to be set in. The usual rule is for the notes to be two sizes less than the text of the work: thus, to pica work, long primer—small pica, bourgeois—long primer, brevier.—Side notes are usually smaller in proportion; and when the work is of the nature of bibles, law-books, &c. in which the side notes, or references, frequently drive down more than the lines of the text to which they refer, the expedient of cut-in-notes must be resorted to. This is a difficult part of a compositor's business, and requires much skill and patience to adjust all parts, so that every line of note and text may have proper and equal bearing. The reglet, scaleboard, or lead, which is placed between the lines of matter and the side-note must be cut with as much nicety as possible to the length of the text, as far as where the note is to run under; and having accurately adjusted, by means of the quotations and justifiers, the situation of the first line of the note, such lead, or scaleboard, is added to the text as will make it precisely correspond in depth with the lines of note that stand on the side before turning: the remainder of the note is then set in a long measure, to correspond in width with the text, reglet, and side-note; and the page is made up with note, or the text begun again after the note is finished. In bibles with notes and annotations, in law books, some classics, and other works, it frequently happens that a page exhibits several of these alternate frame-works of note and text, which, if done well, display a workman's skill to the best advantage; but if done at all ill, nothing exhibits a more vile appearance.

The compositor should be acquainted, on beginning a work, whether it is to consist of more than one volume, that the first page of each sheet may contain the volume to which it belongs, in the left hand corner of the signature line. Signatures are generally set in small capitals; and where they run through the alphabet, the best method is, to begin the second alphabet with 2 A, 2 B, and so on.

The title, preface, &c. of a volume is always left till the body of the work is finished, as many circumstances may alter the author's original preface, date, &c. or the work may conclude in such a manner as to admit of their being brought in at the end, in order to make a complete sheet, which may save both paper and press-work. For this reason it is customary to begin the first sheet of every work with the signature B, leaving A for the title-sheet. To a sheet of octavo two signatures are all that are necessary, they are placed to the first and third pages; to a sheet of twelves, three signatures, which are placed to the first, third, and ninth pages, in the following manner: B, B 2, B 5; B 3 and B 4 being supposed signatures.

In magazines, and works of that nature, printed in half sheets, figures are sometimes put instead of letters, for signatures. This plan is adopted in many respectable houses. It is less liable to cause confusion with the binder, particularly in works of five or six hundred pages.

Instead of beginning the work with a two-line, or larger letter, sunk down for the first two or three lines, a letter two or three sizes above the work is much neater, and now generally used. It is placed with its body rising above the line, yet at the same time exactly ranging with the beard of the bottom of the line; the remainder of the word following this letter may be set either in capitals or small capitals.—See p.

We now proceed to the second page, and set the running title in a neat letter, according to the plan before-mentioned, although it must, in a great measure, be governed by the quantity of matter necessary to be introduced at the head of the page. A full line as a running title has a clumsy appearance, and should be avoided, if possible. To a solid page, two leads make the usual white after the head; to a single-leaded page, three leads, or a long-primer white; and to a double-leaded page, a pica white.

It has long been, and still is, a practice too prevalent among compositors, to drive out a word at the close of a paragraph, or even to divide it, in order to reap the advantage of a break line. Part of a word, or a complete word, in a break line, if it contain no more than three or four letters, is improper. It should be the business of the corrector at all times to notice this encroachment. The last line of a paragraph should not on any account begin a page, neither should the first line of a paragraph come at the bottom of a page, if the work has white-lines between the breaks. To obviate which, the compositor may make his page either a line short or long, as most convenient, only taking care that the page which backs it corresponds, so that the page may not have the appearance of differing from its proper length.

If the work is very open, consisting of heads, whites, &c. the compositor must be particularly attentive to their depth; so that though the whites may be composed of different-sized quadrats, yet that their ultimate depth shall be equal to the regular body of the type the work is done in; for unless care is taken in this particular, the register of the work must be incomplete. The pressman cannot make the lines back if the compositor is not careful in making up his matter.

The first line of a new paragraph is indented an m-quadrat, of whatever size the letter of the work may be. Authors vary very materially in the mode of making paragraphs; some carry the argument of a position to a great length, before they relieve the attention of the reader; while others break off almost at every place that will admit only of a full point. But in this case we follow the author's plan, unless, upon particular occasions, it may be necessary to multiply or reduce the breaks in the copy, if it can be done with propriety, in order to make the work look uniform. Authors should always make the beginning of a new paragraph conspicuous to the compositor, by indenting the first line of it far enough to distinguish it from the preceding line, in case it should be quite full.

Many hints, in addition to what have already been dropped, relative to composing, might be added for the information of learners, were we not persuaded that practice and a close attention to the mode of doing business by good workmen, will be of more service to them than a multiplicity of rules. It is the duty of the person under whose tuition an apprentice is placed, to discharge that trust with fidelity. The youth's future prospects in life depend in a great measure on the principles on which his first instructions are formed; and it is the duty of every man to correct those habits in youth which may be improper, whether arising from carelessness or any other cause. When a youth makes choice of a profession, and is aware that his future support and prospects in life must depend on a correct knowledge of that profession, he should be anxious to attain that knowledge; but to withhold it from him, or to allow the practice of improper habits, is, in his preceptor, a neglect highly reprehensible, as it is unjust.

After the body of a volume is completed, the Contents sometimes follow next, though they belong more properly to the beginning of the work; and for this reason we shall defer speaking of them here, and introduce them in their proper place. The Index is generally placed at the end of the volume, and set in letter two sizes less than that of the work, or even less, according to circumstances; it is always begun upon an odd, or right-hand page. Running titles may be set to an index, but folios are seldom put to them, unless it is to recommend the book for its extraordinary number of pages; for as an index does not refer to its own matter by figures, they are needless in this case. The signatures, however, are always carried on regularly to the last whole or half sheet of the work.

It was formerly the plan to set the subject word of each article in the index in italic, and all the rest in roman, indenting all the matter an m-quadrat that makes above one line, which is technically termed—to run out and indent, but the italic is now in a great measure exploded, it being attended with extra trouble, and at the same time destroys the uniformity of the page.

Care should be taken that the subject words are ranged alphabetically, as it is not expected that the compositor will transpose his matter afterwards, which is attended with loss of time, without being paid for it.

Where figures have a regular succession, a comma is put after each folio; and where their order breaks off, a full point is used. Thus, for example, after 5, 6, 7, 8, commas are put; and after 12. 16. 19. 24. full points; but to save figures and commas, the succession of the former is noticed by putting a rule betwixt the first and last figures, thus, 5—8. Again, if an article has been collected from two pages, the folio of the second is supplied by *seq.* or *sequcnte;* and by *sqq.* or *sequentibus,* where an article is touched upon in different succeeding pages. A full point is not put after the last figures because it is thought that their standing at the end of a line is a sufficient stop. Neither is a comma or a full point placed at the last word of an article, in a wide measure and open matter; but it is not improper to use a comma at the end of every article in narrow columns, or where figures are put after the matter, instead of running them to the end of the line.

At the conclusion of the index the volume is considered as completed, with the exception of the title, preface, &c. A compositor's first consideration, then, is in what manner the work has ended, what number of pages the titles, &c. will make, and whether he can impose them in such a form as to save paper or presswork. To answer this purpose, a preface may be driven out or got in; or, if matter is wanting, it is customary to set a half-title.

The method of setting or displaying a title-page is governed entirely by fancy; and in this country the style is much altered for the better, of late years, as a comparison between the title-pages of the last and the present century will fully prove. No fixed rules for instruction on this head can be laid down, as it depends so much on the taste and ingenuity of the printer, and the words which are given him to work upon; we shall, therefore, recommend the learner, as a help or guide to him in this part of his business, to refer to such printed titles as are considered neatly executed.

Authors should endeavour to make their title-pages as short and concise as possible; for a crowded title never can be displayed with elegance or taste.

The dedication generally follows the title, and seldom exceeds one page. It should be set in capitals and small capitals, displayed in the manner of a title: but where it extends to a considerable length, it is generally set in a letter two sizes larger than the work. There is neither folio nor direction line required to it, where it does not exceed a page; but if it happen to be the third page of the sheet, the signature must be inserted. The French Manual gives very particular directions upon this head, "When a book is divided by several different titles, we must give to each division its suitable type. Thus, if we set the word 'Part' in two-line pica, we should set 'Chapter' in two-line long primer, 'Article' in great primer, and 'Section' in English."—In English works this does not often occur, but the principle laid down is very proper. "In Epistles Dedicatory, the name of the person to whom the work is dedicated should always be in capitals, and when a book is dedicated to Emperors, Princes, or Lords, the words Majesty, Highness, My Lord, &c., should be set in small capitals: the conclusion of these epistles, viz. the terms, Your very humble and very obedient, &c. &c. should be set in a smaller type, and the signature, or name of the author, in capitals of a less fount than that in which the name of the personage to whom dedicated has been set."

Formerly, the preface was uniformly set in italic; at present, this plan is seldom adopted, and roman is used in its stead, of one size larger than the body of the work. The running title to the preface is commonly set in the same manner as those of the body of the work, at the same time the folios are put in numeral letters beginning with ii over the second page, and continued in the usual manner. If the work itself was printed with folios only, then the preface should have them also in the middle of the line.

The Title, Dedication, Preface, Introduction, &c. form what is called the title-sheet, viz. signature A, which makes the bookseller's alphabet (consisting of 23 letters) complete, provided that the body of the work begins with B. To ascertain more readily how many sheets a book consists of, more than are marked with signatures in capitals or small capitals, a lower-case roman a is put to the first sheet after the title sheet, and thus carried on till the beginning of the body of the work.

What has been observed concerning Prefaces, relates equally to Introductions, drawn up and intended to elucidate their respective works.

The Contents follow the Preface or Introduction, and are either set in roman or italic, generally of a size smaller than the body of the work; the first line of each summary full, and the rest indented an m-quadrat, with the referring figures justified at the ends of the respective lines.

The Errata are put immediately before the body of the work, or at the end of it. It is most devoutly to be wished that works could issue from the press perfectly free from errors; but, in regard to the profession of printing, more, perhaps, than any other, we may say with Pope—

> Whoever thinks a faultless piece to see,
> Thinks what ne'er was, nor is, nor e'er shall be.

Fewer mistakes would be made, were authors to endeavour to render their copy more legible, before they place it in the hands of the printer. It can hardly be expected that the corrector, under whose inspection such a variety of subjects are continually passing, should be able to enter thoroughly into every one of them, and to guess so nicely at the author's meaning, when the copy is obscure, and unable to afford him any assistance: besides, every forme is exposed to accidents which can seldom be detected as it passes through the hands of the printer; so that every additional proof may be productive of fresh error. Letters are sometimes drawn in the working, and others battered in moving and unlocking the forme, in order to make register.

The errata should consist of such corrections only as are *indispensably necessary*, without noticing any defects in the punctuation, unless where the sense is perverted.

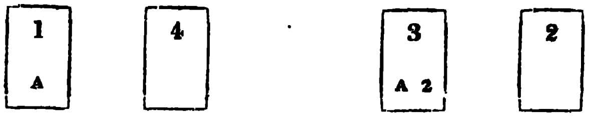
Of Imposing.

IMPOSING comprehends not only the knowledge of placing the pages that they may, after they are printed off, and the sheet folded, follow each other regularly, but also the manner of dressing the furniture, and making the proper margin.

Having composed as many pages as make a whole sheet, half sheet, or less part of a sheet, of whatever size, they are taken from under the frame, and carried to the imposing stone; taking care to put the first page in its right position, with the signature to the left hand, facing the workman, according to the following schemes :—

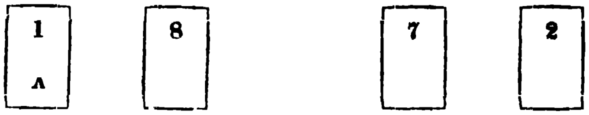
A SHEET IN FOLIO.

Outer Forme. *Inner Forme.*

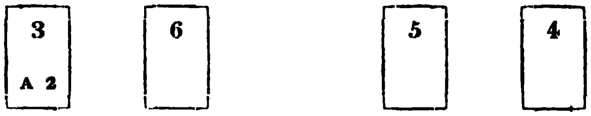


TWO SHEETS IN FOLIO, QUIRED, OR PLACED ONE IN ANOTHER.

Outer Forme of the Outer Sheet. *Inner Forme of the Outer Sheet.*



Outer Forme of the Inner Sheet. *Inner Forme of the Inner Sheet.*

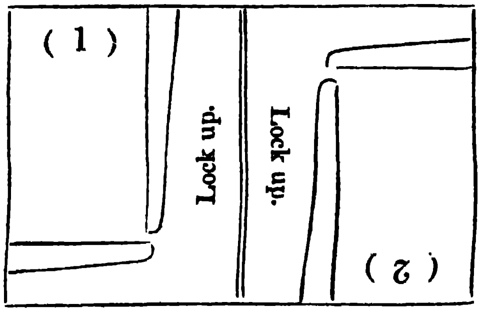


Imposing in quires may be carried to any extent, by observing the following rule:—Suppose the work to consist of 32 pages, or 8 sheets, then lay 1 and 32, 2 and 31, 3 and 30, 4 and 29, &c. and as a proof of laying right, observe that every pair will make, in united numbers, one more than the sheet, as 1+32 = 33, 2 + 31 = 33, 3 + 30 = 33, and so on. Indeed, the same rule will apply to all imposition; thus, in octavo, the pages laying together, will be 1 and 16 = 17, 2 and 15 = 17, 3 and 14 = 17, &c.; in twelves, 1 and 24 = 25, 2 and 23 = 25, 3 and 22 = 25, and so on.

There must be less furniture in the backs of the first sheet than the last, to allow for stitching.

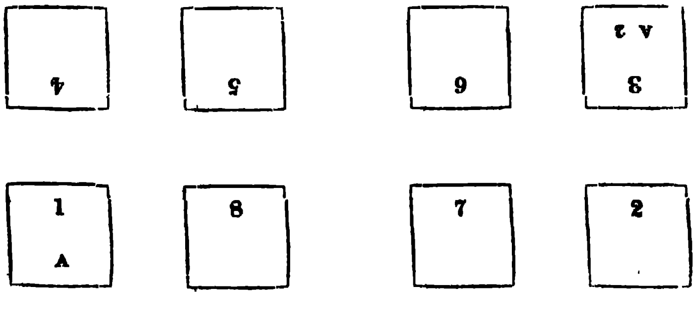
THE MODE OF IMPOSING ABSTRACTS OF TITLE DEEDS.

These are printed with blanks at the backs, with all the margin on the left side, and on single leaves, being stitched at the corner. The following is the method of imposing the forme to save press-work, as well as the charge of the compositor.

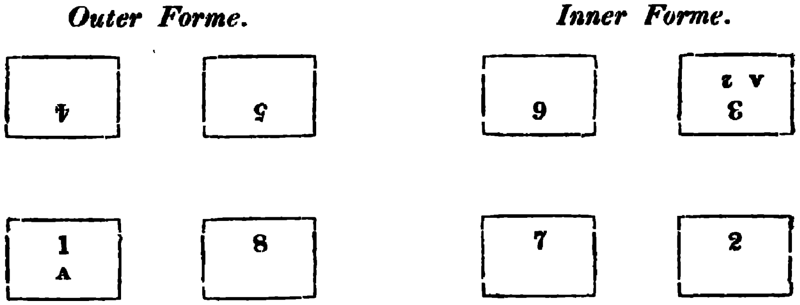


A SHEET OF COMMON QUARTO.

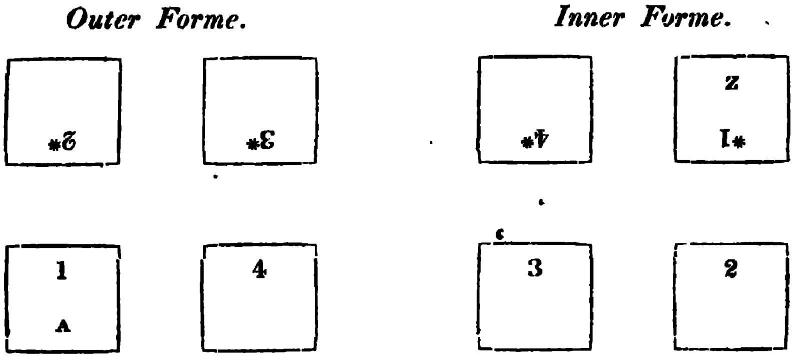
Outer Forme. *Inner Forme.*



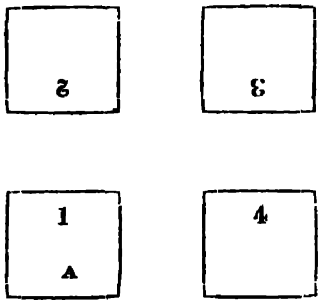
A SHEET IN BROAD QUARTO.



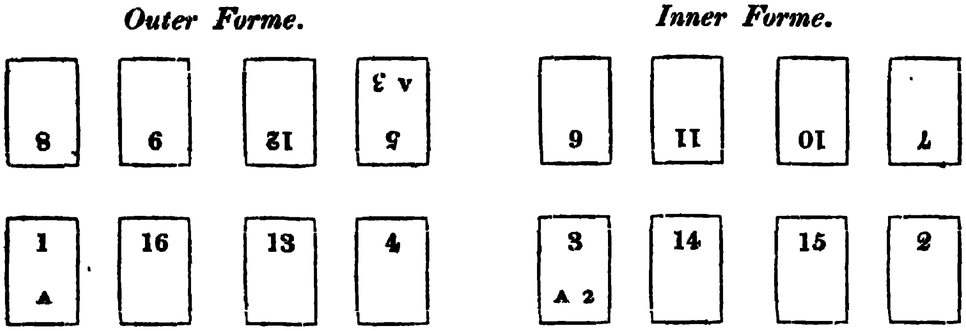
TWO HALF SHEETS IN QUARTO, WORKED TOGETHER.



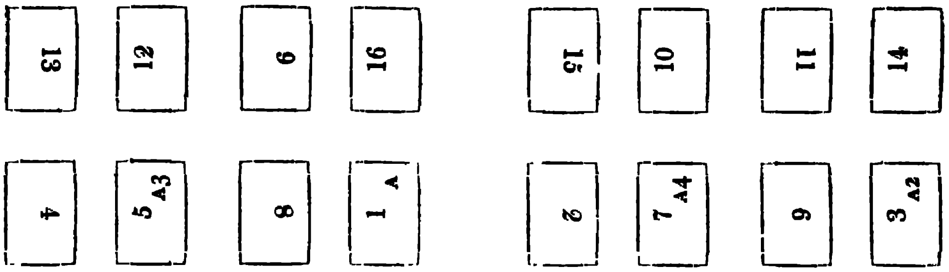
HALF A SHEET OF COMMON QUARTO.



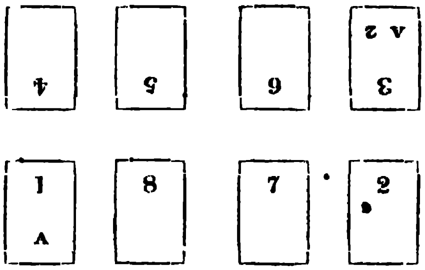
A SHEET OF COMMON OCTAVO.



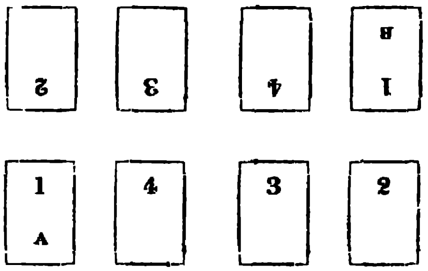
A SHEET OF BROAD OCTAVO.


Outer Forme. Inner Forme.

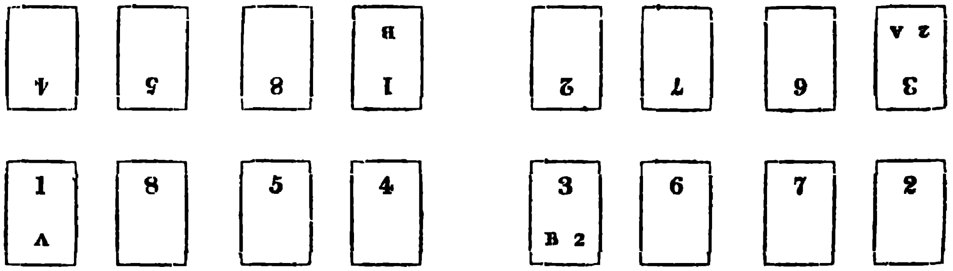
HALF A SHEET OF COMMON OCTAVO.



TWO QUARTERS OF A COMMON OCTAVO.

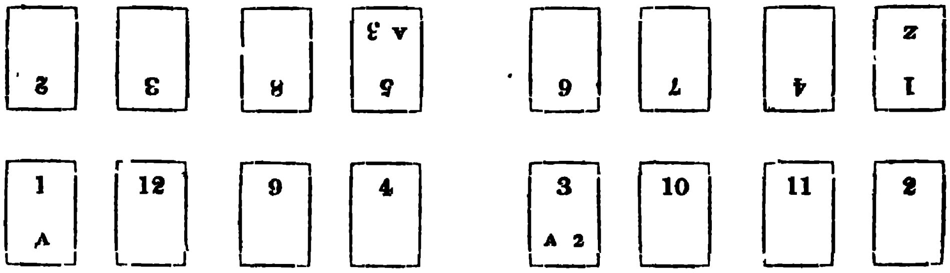


TWO HALF SHEETS OF COMMON OCTAVO, WORKED TOGETHER.

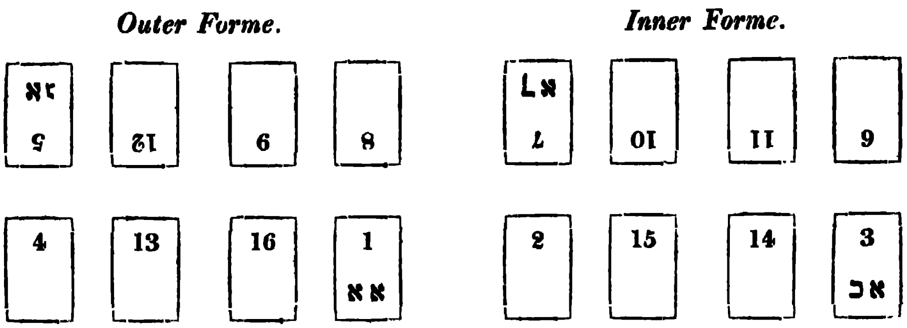

Outer Forme. Inner Forme.

SHEET OF OCTAVO WITH TWO SIGNATURES,

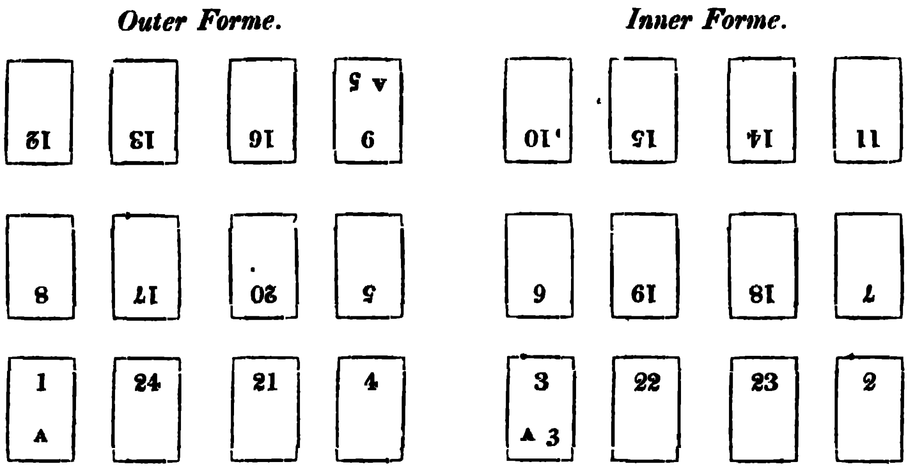
(12 *concluding pages of a work, and* 4 *of other matter.*)


Outer Forme. Inner Forme.

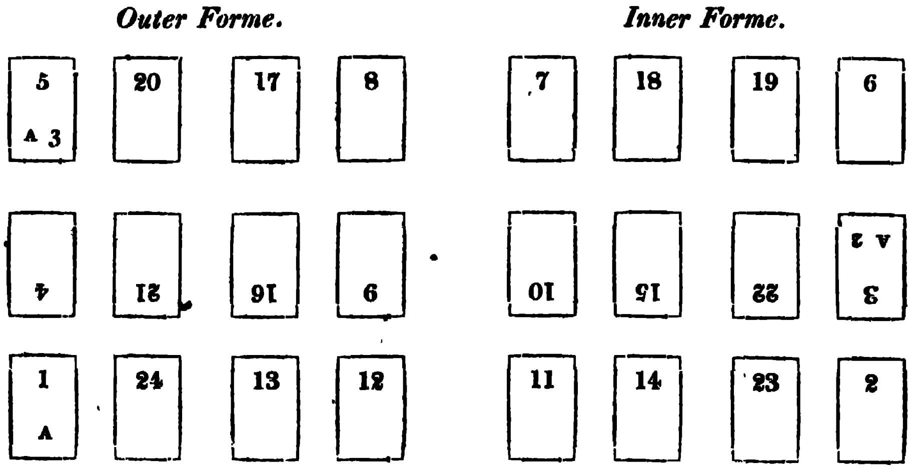
A SHEET IN OCTAVO, OF HEBREW WORK.



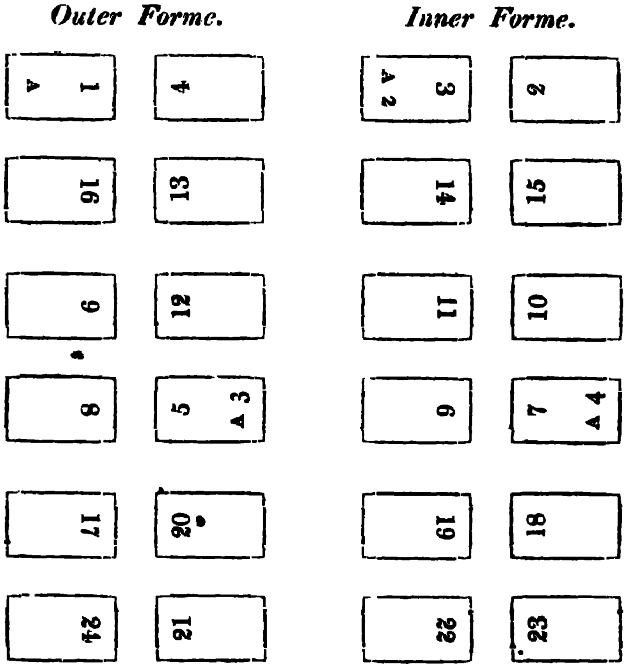
A SHEET OF TWELVES.



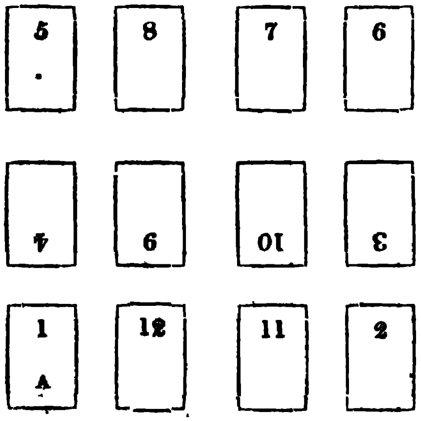
A SHEET OF TWELVES, WITHOUT CUTTING.



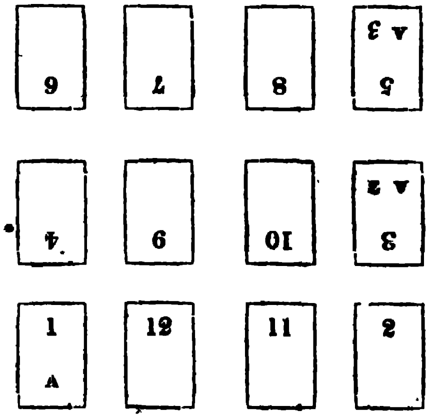
A SHEET OF LONG TWELVES.



HALF SHEET OF TWELVES WITHOUT CUTTING.

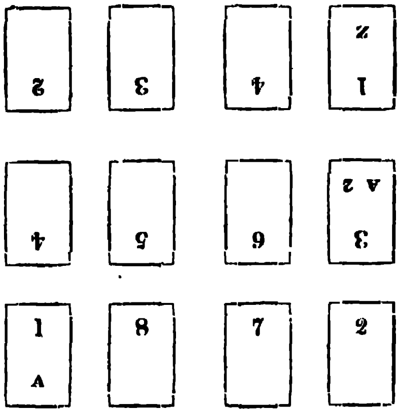


A COMMON HALF SHEET OF TWELVES.



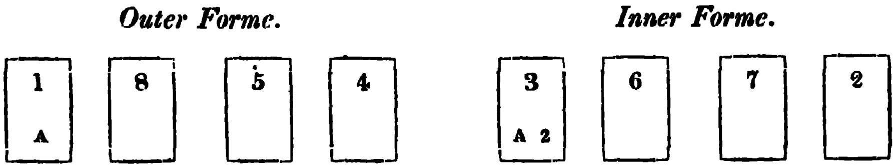
HALF SHEET OF TWELVES WITH TWO SIGNATURES,

(being 8 concluding pages of a work, and 4 of other matter.)

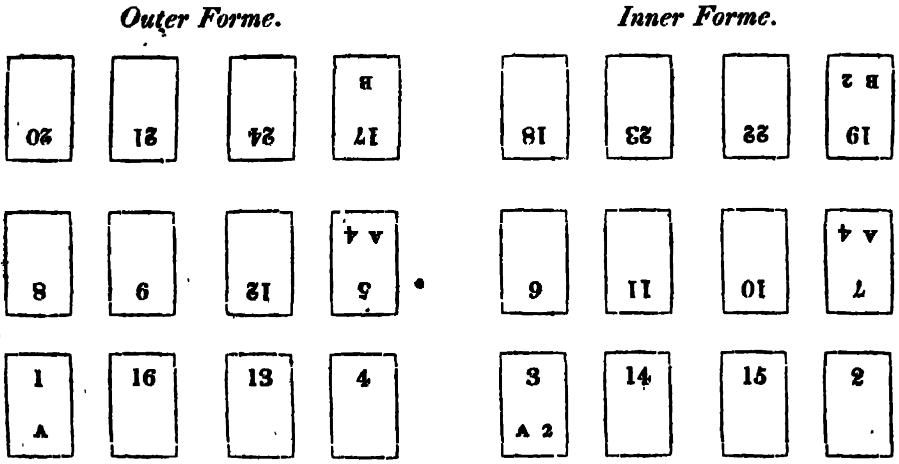


ONE-THIRD, OR EIGHT PAGES OF A SHEET OF TWELVES.*

(To be imposed in the off-cross.)



A SHEET IN TWELVES, WITH TWO SIGNATURES.



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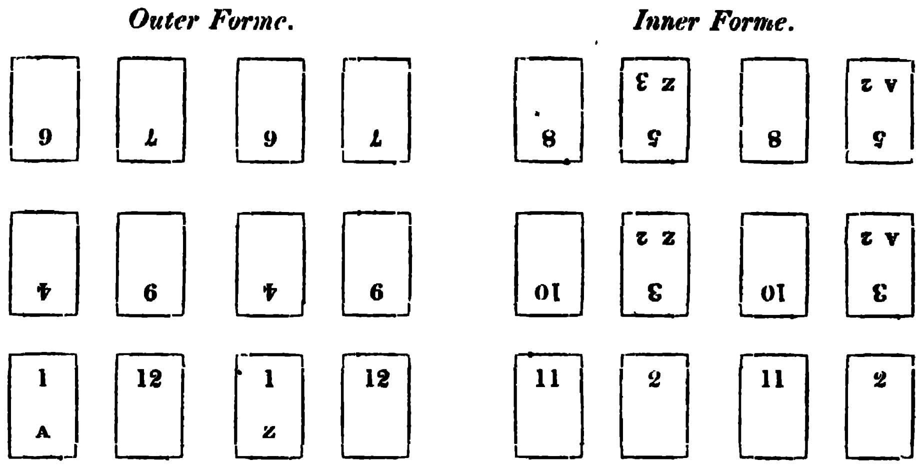
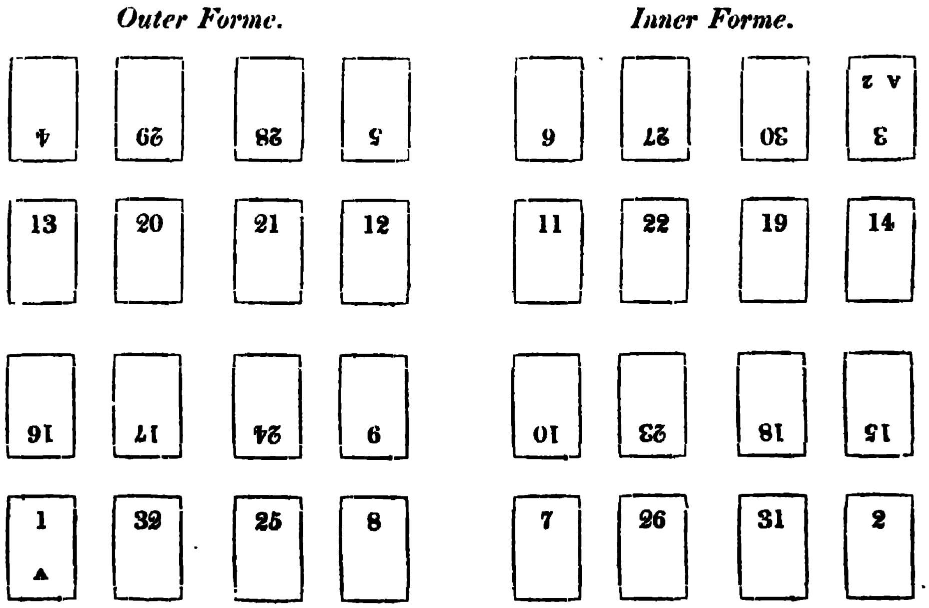
* This will cost the same working as a sheet, but there will be no waste of paper; on the other hand, if, by calculation, the paper is found to be of less value than the working, it will save half the expense of the latter by imposing in one forme, as half a sheet of octavo, and wasting the off-cut of the paper.

TWO HALF SHEETS OF TWELVES WORKED TOGETHER.



A SHEET IN SIXTEENS, WITH ONE* SIGNATURE.



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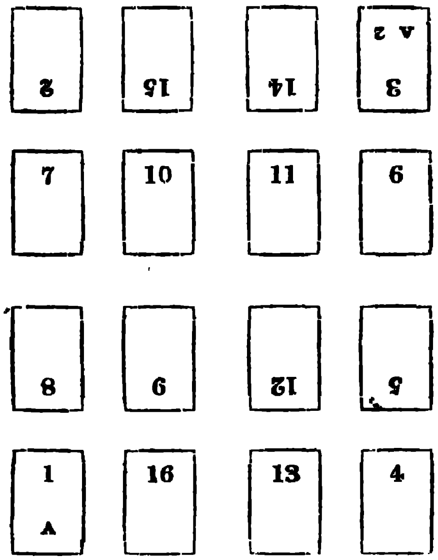
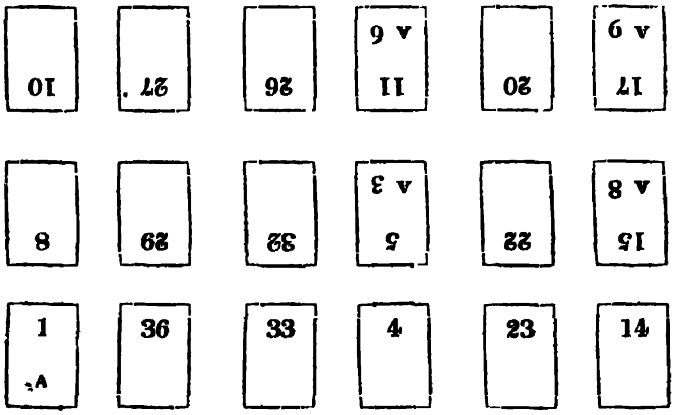
* A sheet in sixteens, with two signatures, is imposed as two sheets of common octavo, putting the first signature for the one half sheet where A stands above, and the first page of the other half sheet in the place where the fifth page is.

A HALF SHEET IN SIXTEENS.

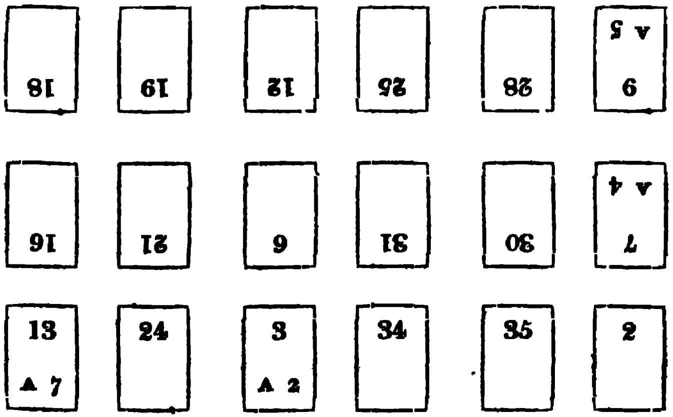


A SHEET OF EIGHTEENS, WITH ONE SIGNATURE.

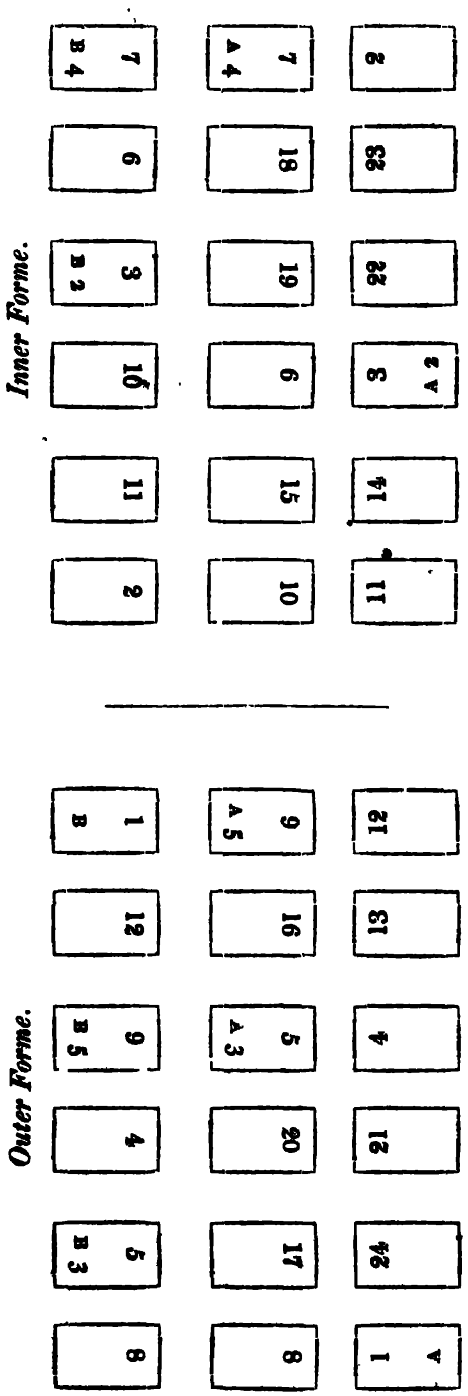
Outer Forme.



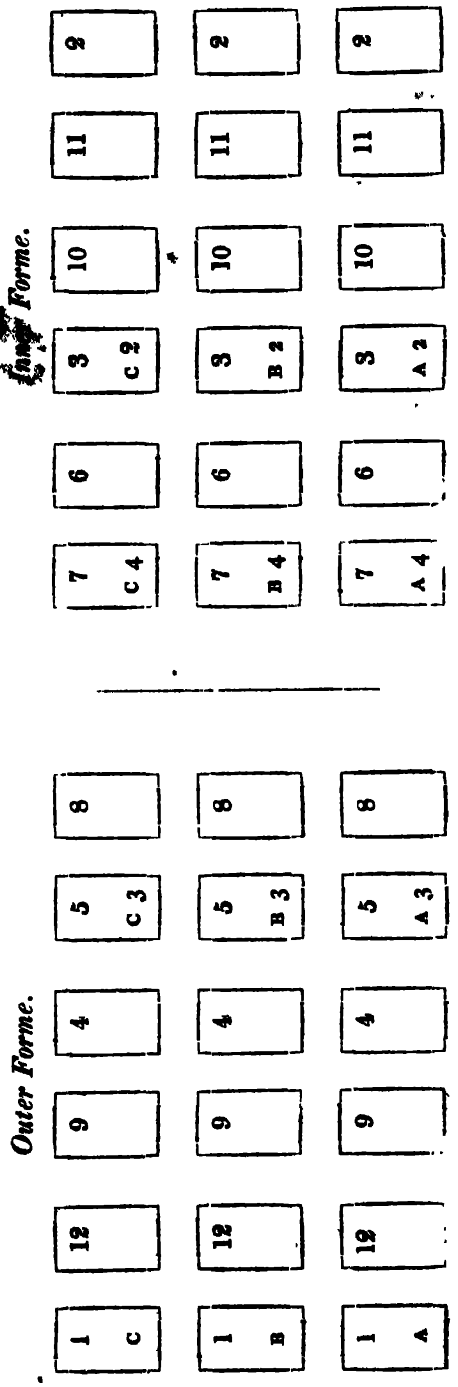
Inner Forme.



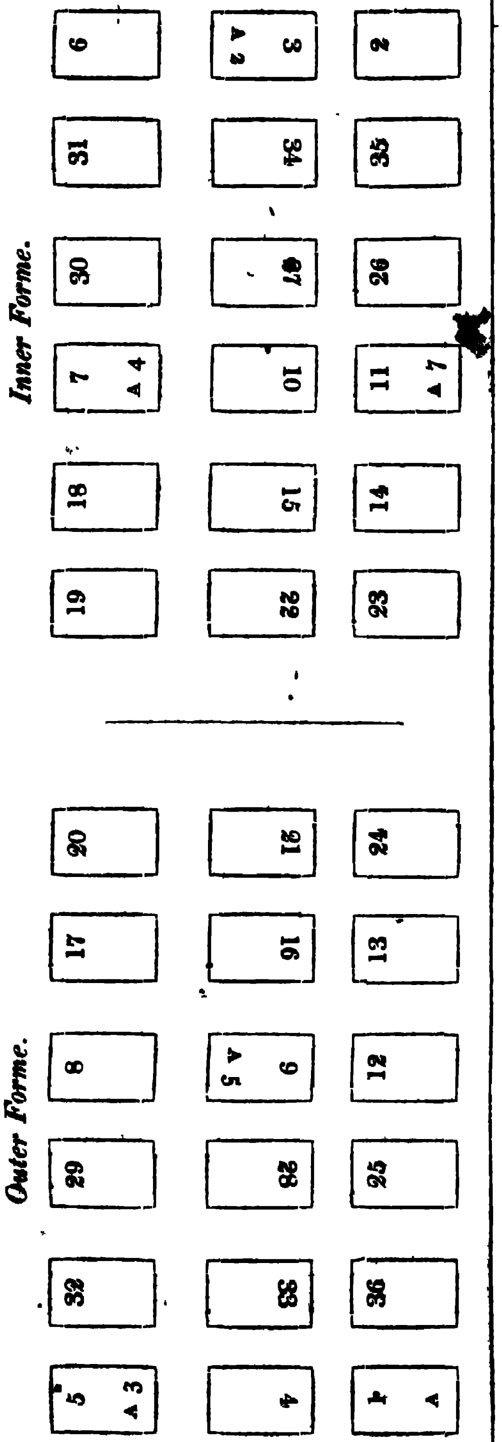
A SHEET OF EIGHTEENS,
WITH TWO SIGNATURES.



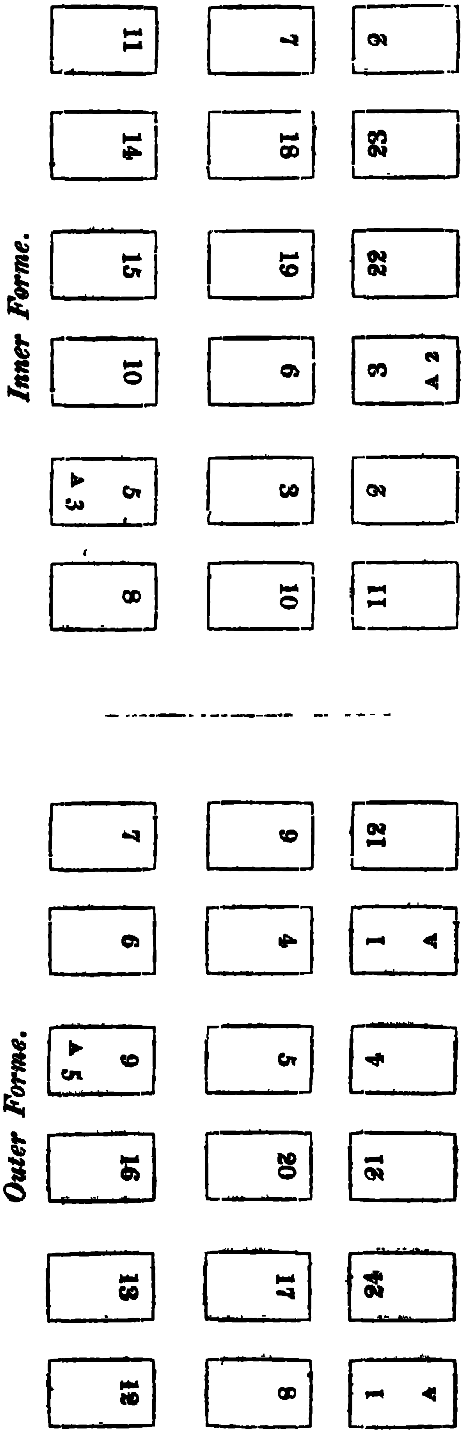
A SHEET OF EIGHTEENS,
WITH THREE SIGNATURES, AS
THREE HALF SHEETS OF TWELVES.



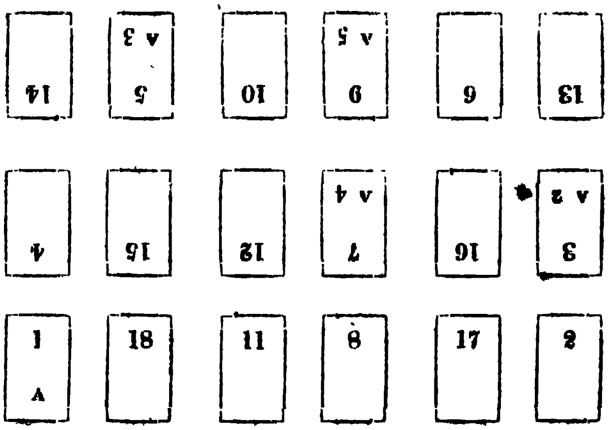
A SHEET OF EIGHTEENS, TO BE FOLDED UP TOGETHER.



A SHEET OF EIGHTEENS, AS A SHEET OF TWELVES AND A HALF SHEET OF TWELVES.

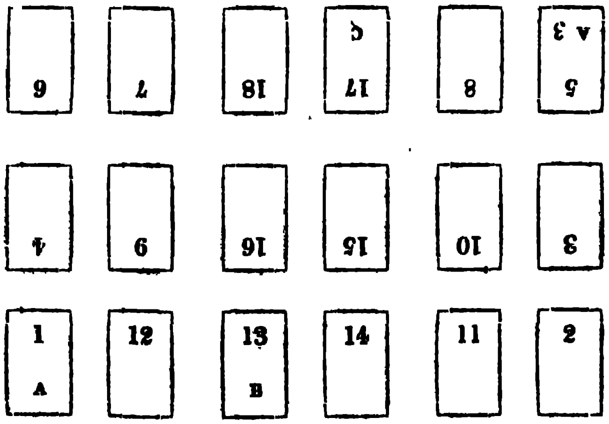


A HALF SHEET OF EIGHTEENS.

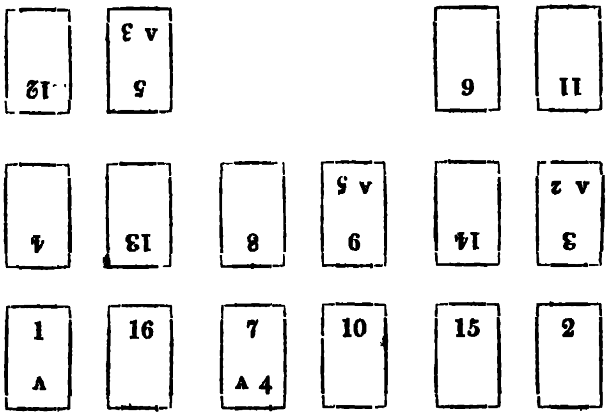


The white paper of this forme being worked off, the four lowermost pages in the middle must be transposed; viz. pages 8, 11, in the room of 7, 12, and pages 7, 12, in the room of 8, 11.

A HALF SHEET OF EIGHTEENS, WITHOUT TRANSPOSING THE PAGES.

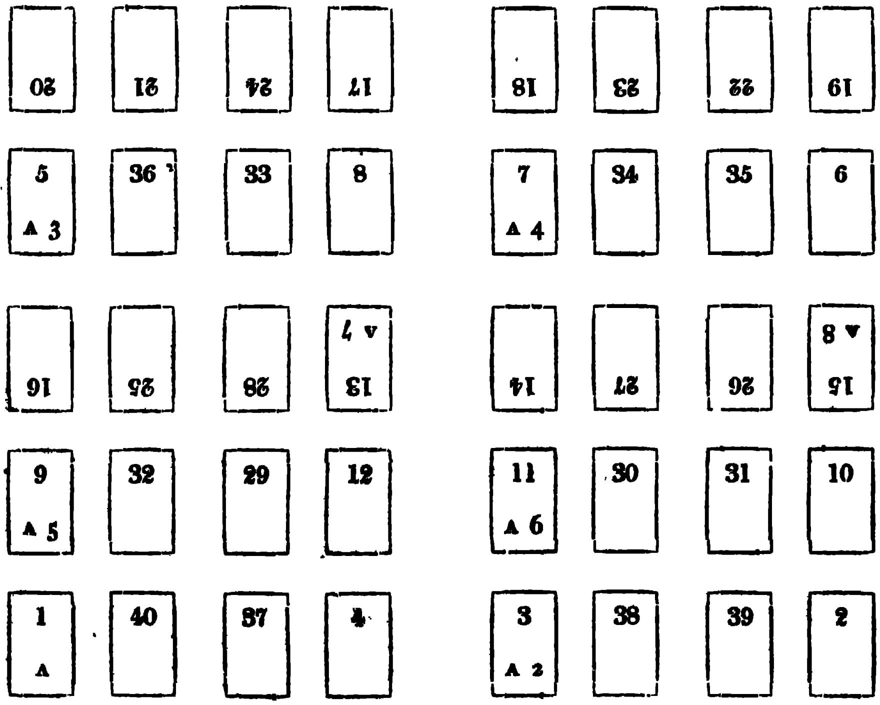


SIXTEEN PAGES TO A HALF SHEET OF EIGHTEENS.

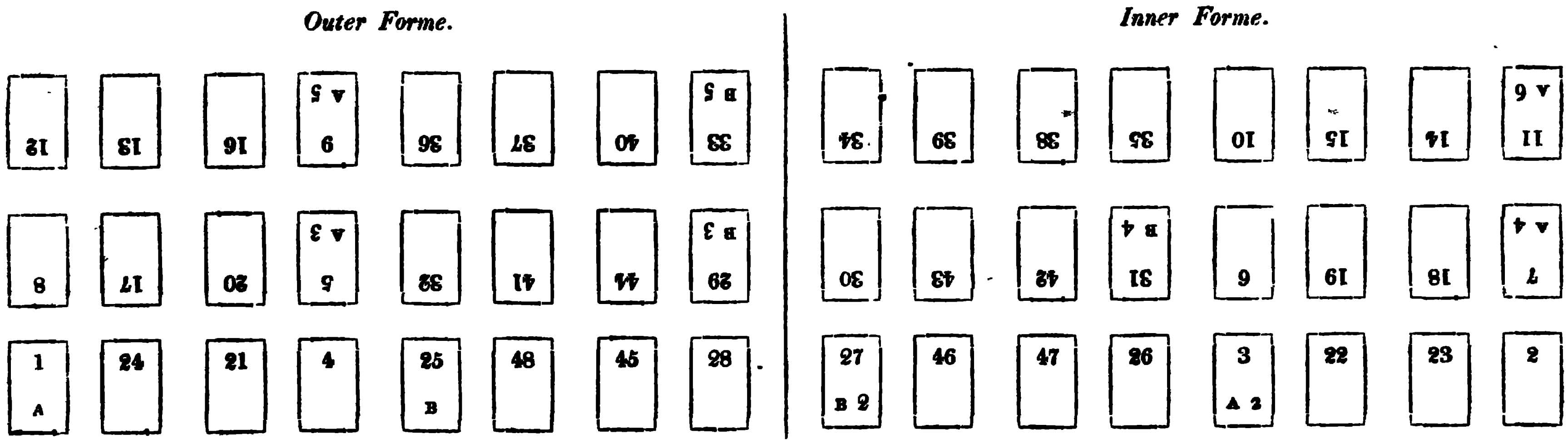


The white paper of this half-sheet being worked off, the middlemost pages must be transposed; viz. pages 7, 10, in the places of 8, 9, and pages 8, 9, in the places of 7, 10.

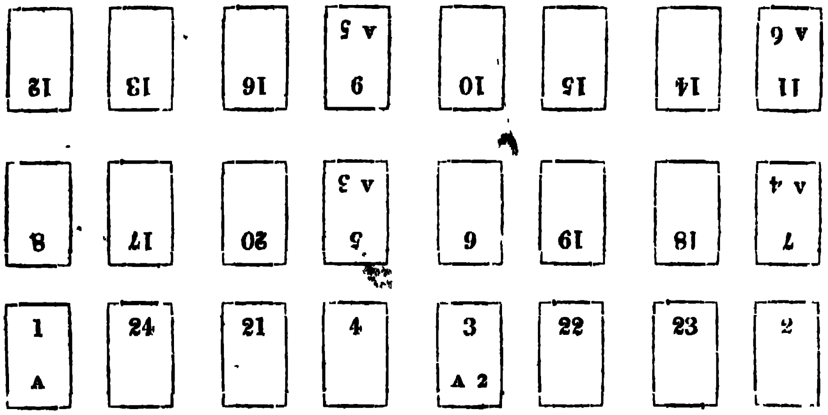
A SHEET OF TWENTIES.


Outer Forme. *Inner Forme.*

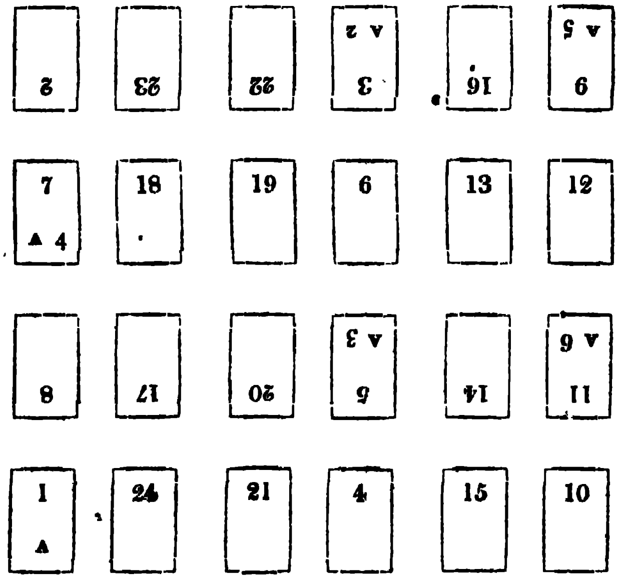
A SHEET OF TWENTY-FOURS, WITH TWO SIGNATURES.



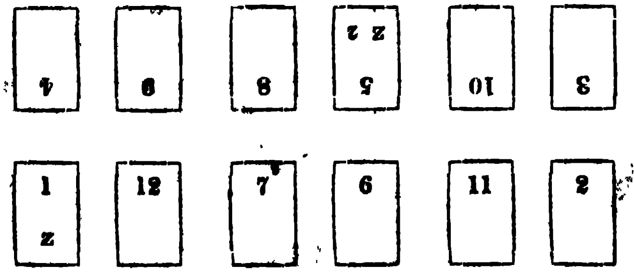
A COMMON HALF SHEET OF TWENTY-FOURS.



A HALF SHEET OF TWENTY-FOURS, THE SIXTEEN-WAY.

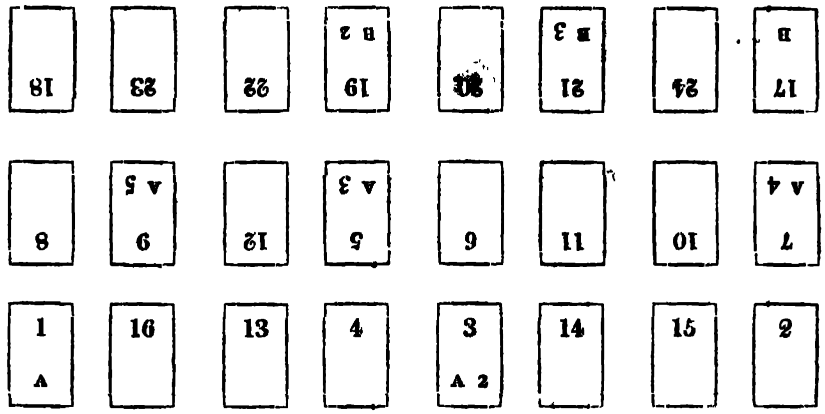


A QUARTER SHEET OF TWENTY-FOURS.

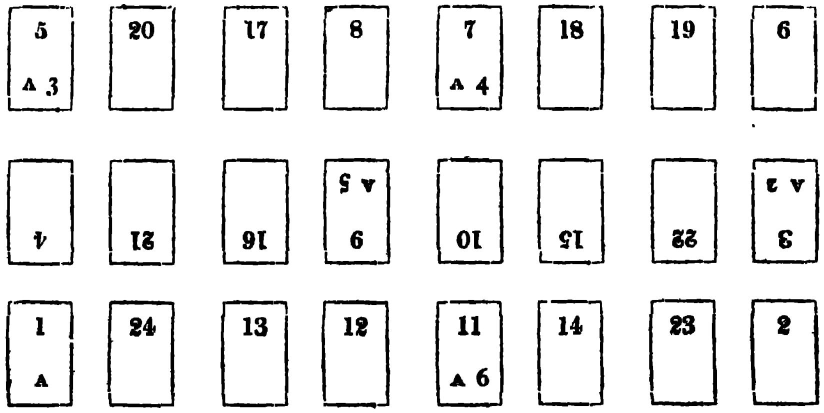


The white paper of this quarter sheet being worked off, the middlemost pages must be transposed, viz. pages 5, 7, in the places of 6, 8, and pages 6, 8, to the places of 5, 7.

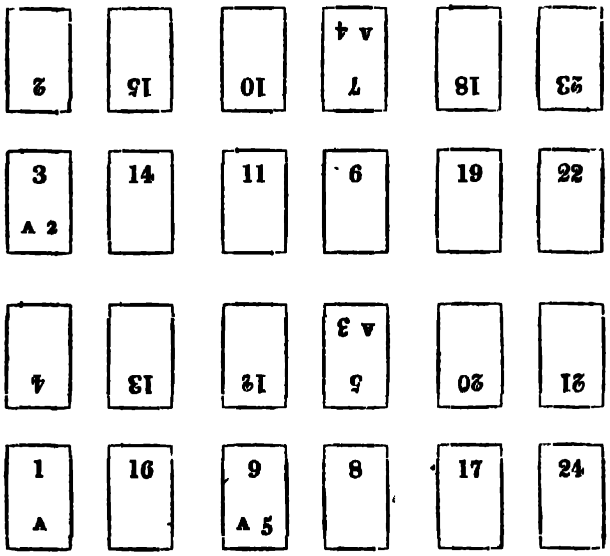
A HALF SHEET OF TWENTY-FOURS, WITH TWO SIGNATURES.



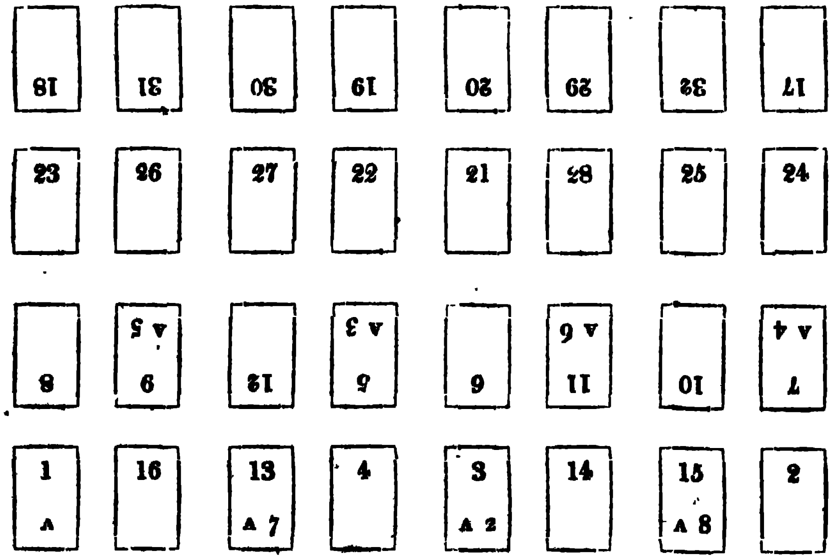
A HALF SHEET OF TWENTY-FOURS, WITHOUT CUTTING.



A HALF SHEET OF LONG TWENTY-FOURS.

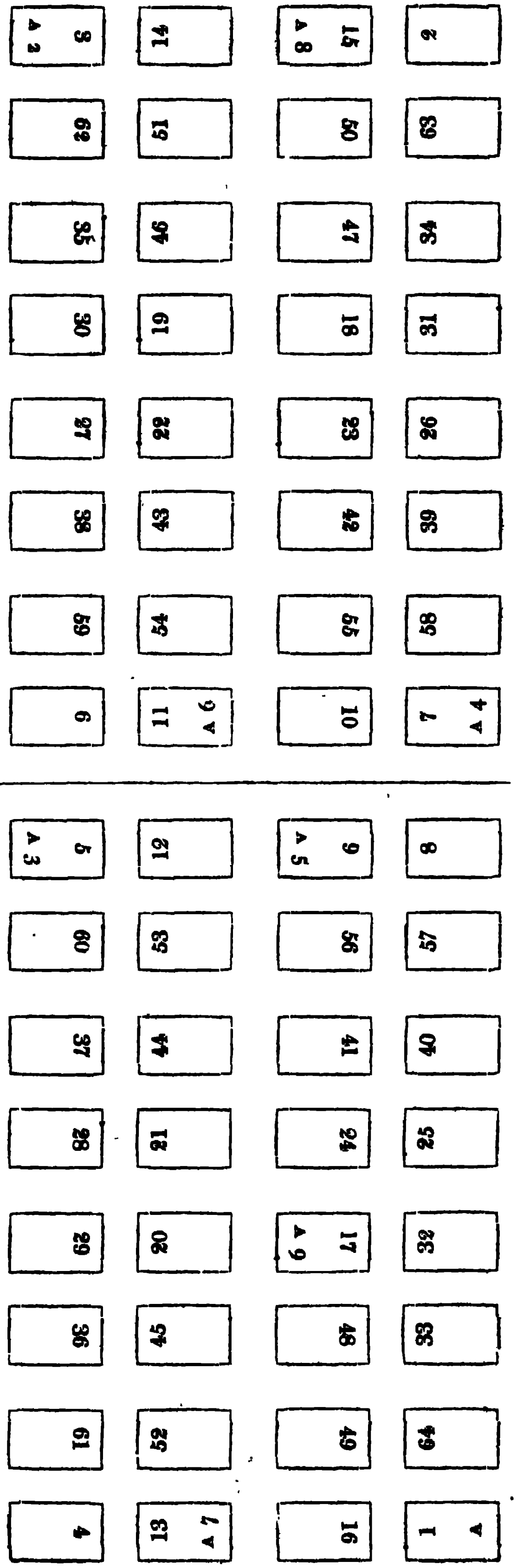


A HALF SHEET OF THIRTY-TWOS.

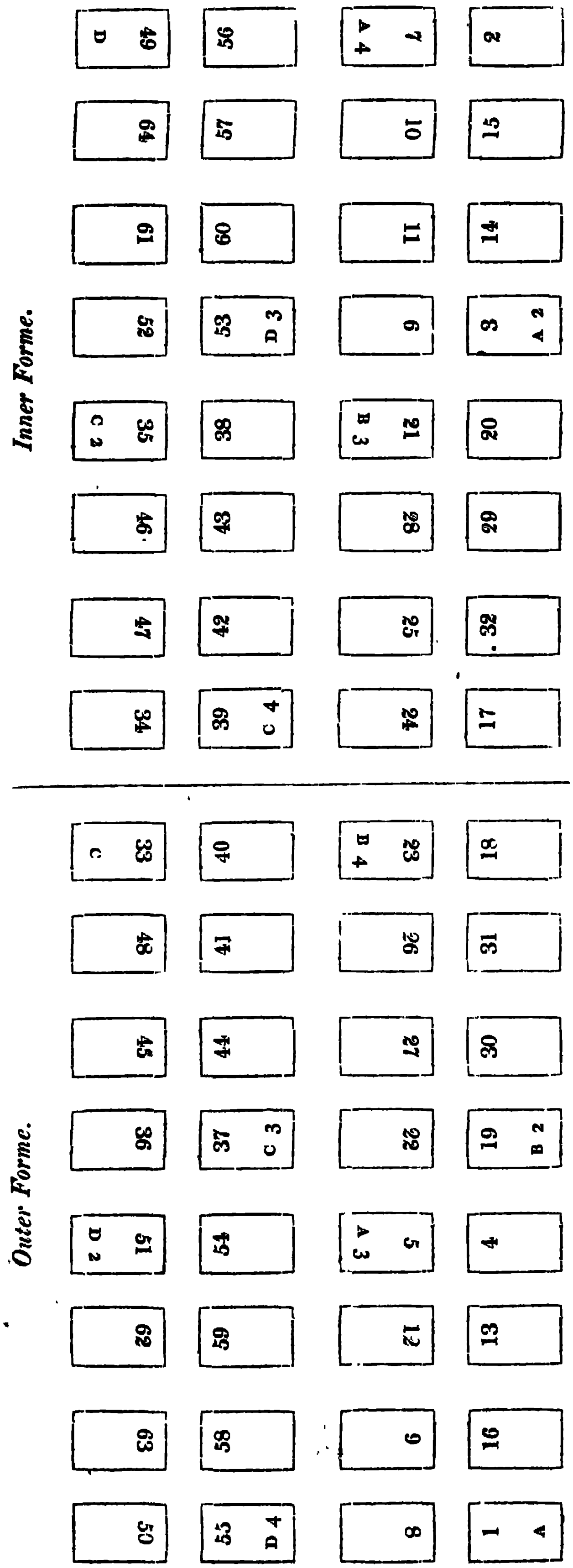


A SHEET OF THIRTY-TWOS.

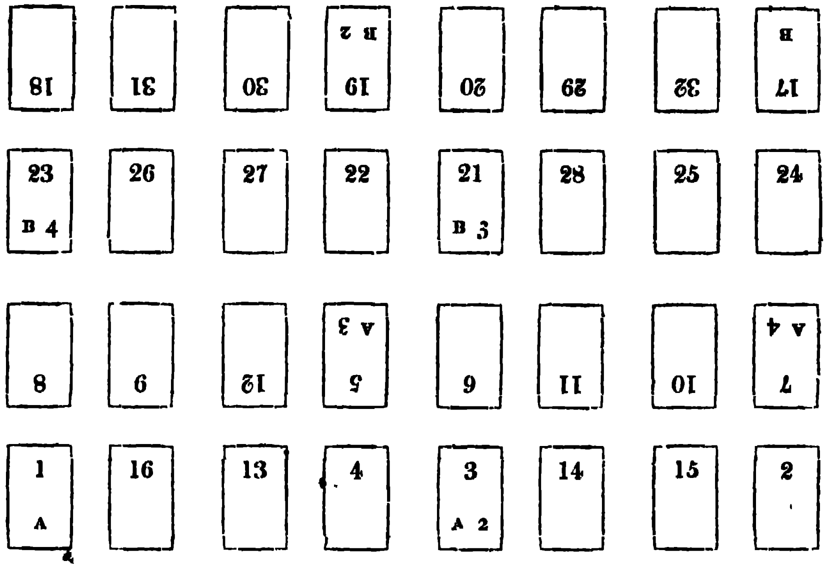
Outer Forme. *Inner Forme.*



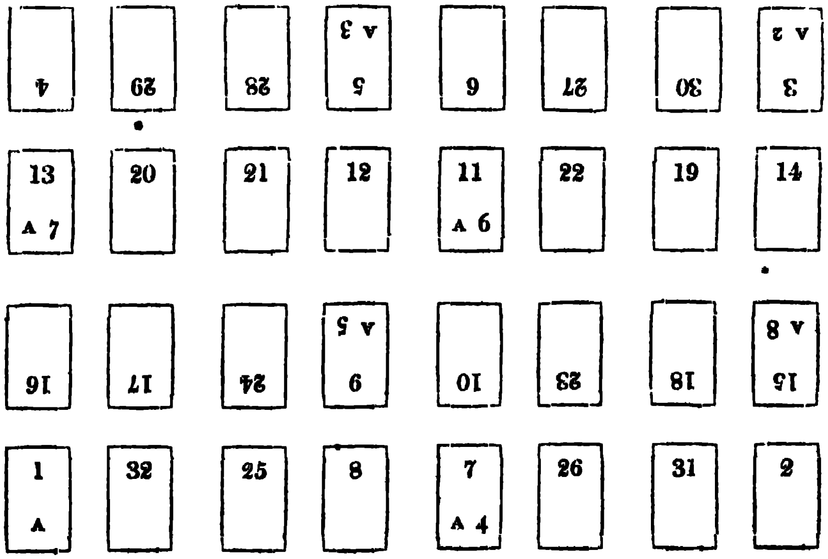
A SHEET OF THIRTY TWOS, WITH FOUR SIGNATURES.



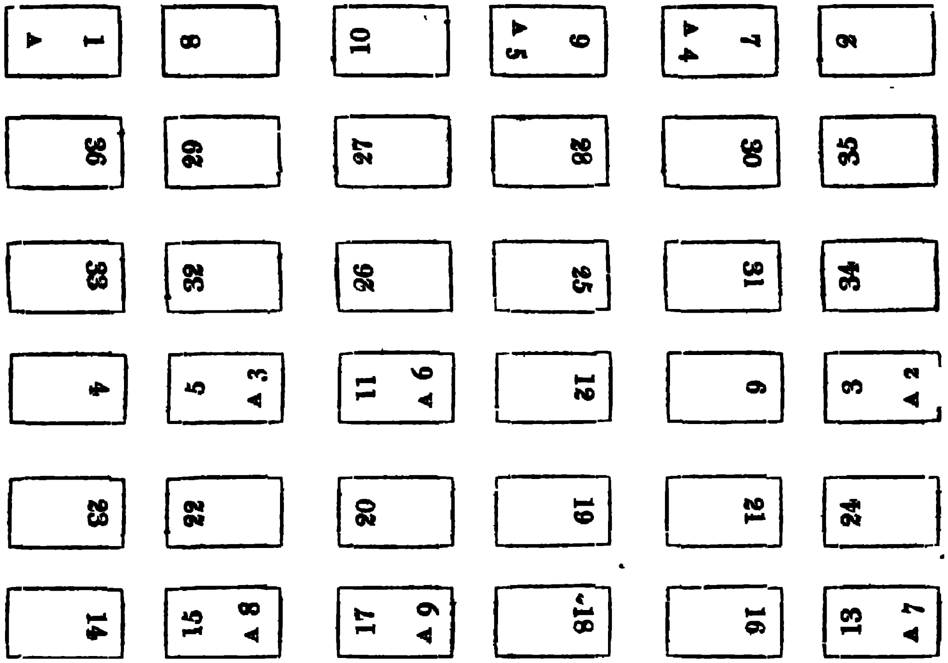
A HALF SHEET OF THIRTY-TWOS, WITH TWO SIGNATURES.



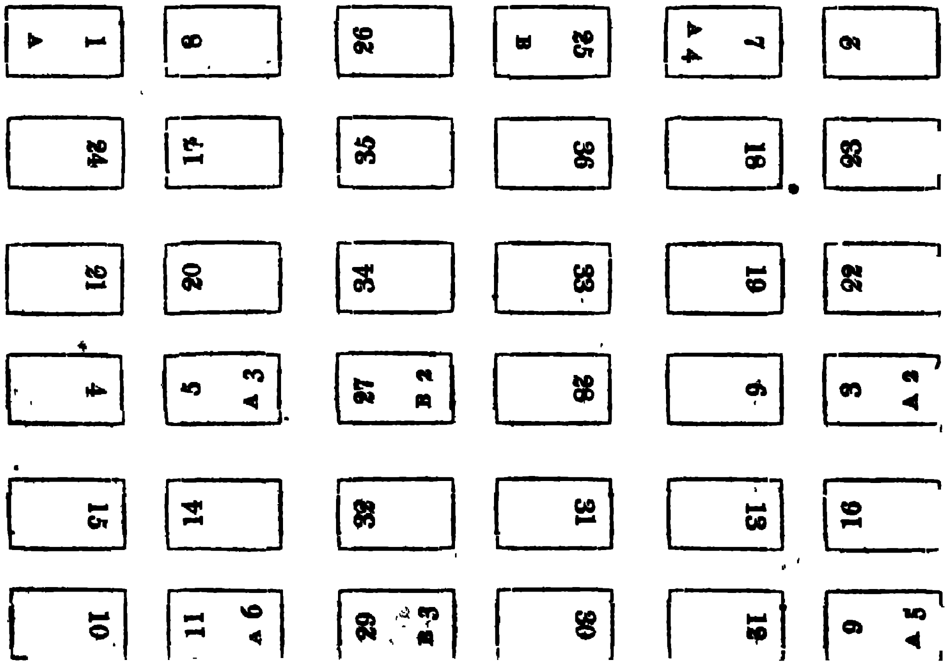
A COMMON HALF SHEET OF THIRTY-TWOS.



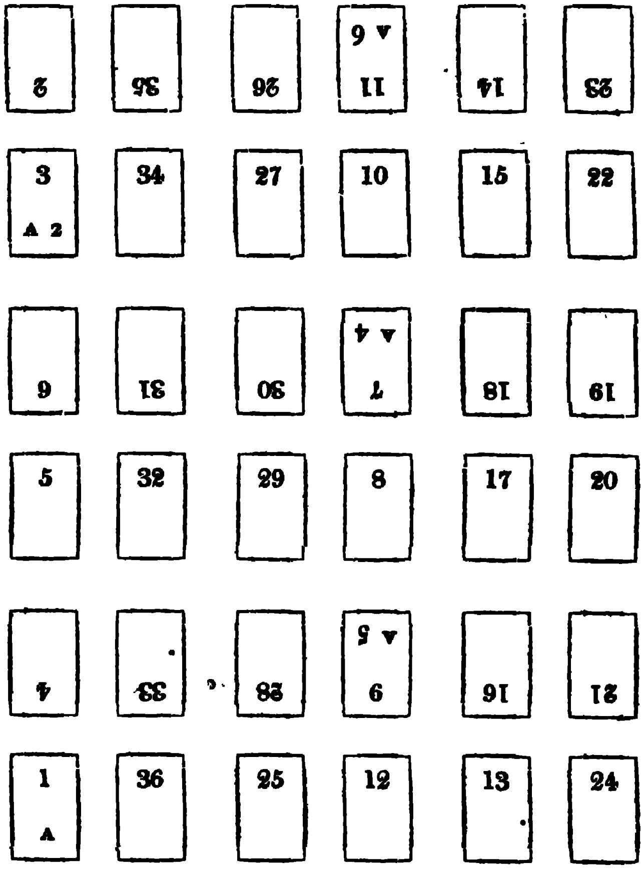
A HALF SHEET OF THIRTY-SIXES.



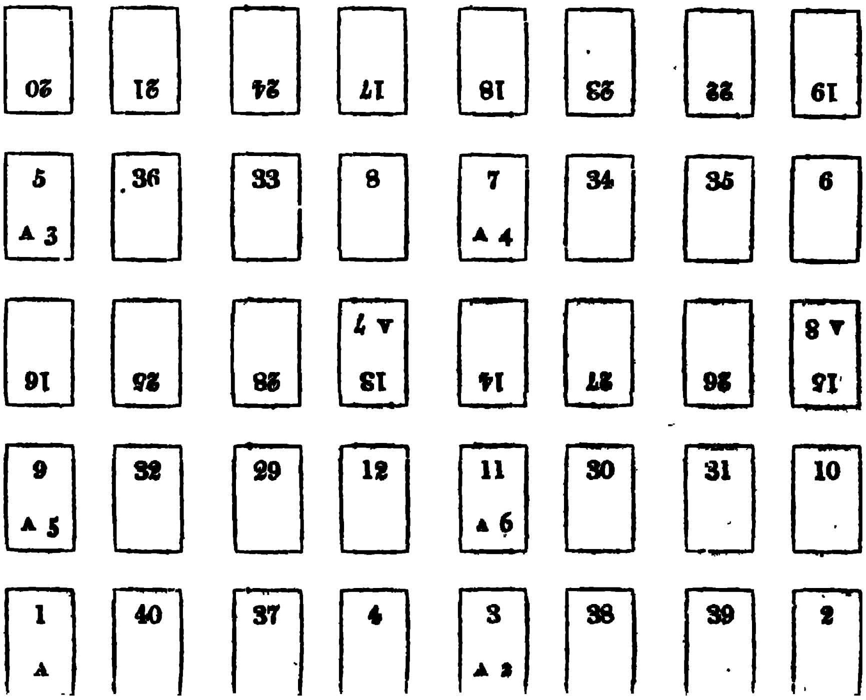
A HALF SHEET OF THIRTY-SIXES, WITH TWO SIGNATURES.



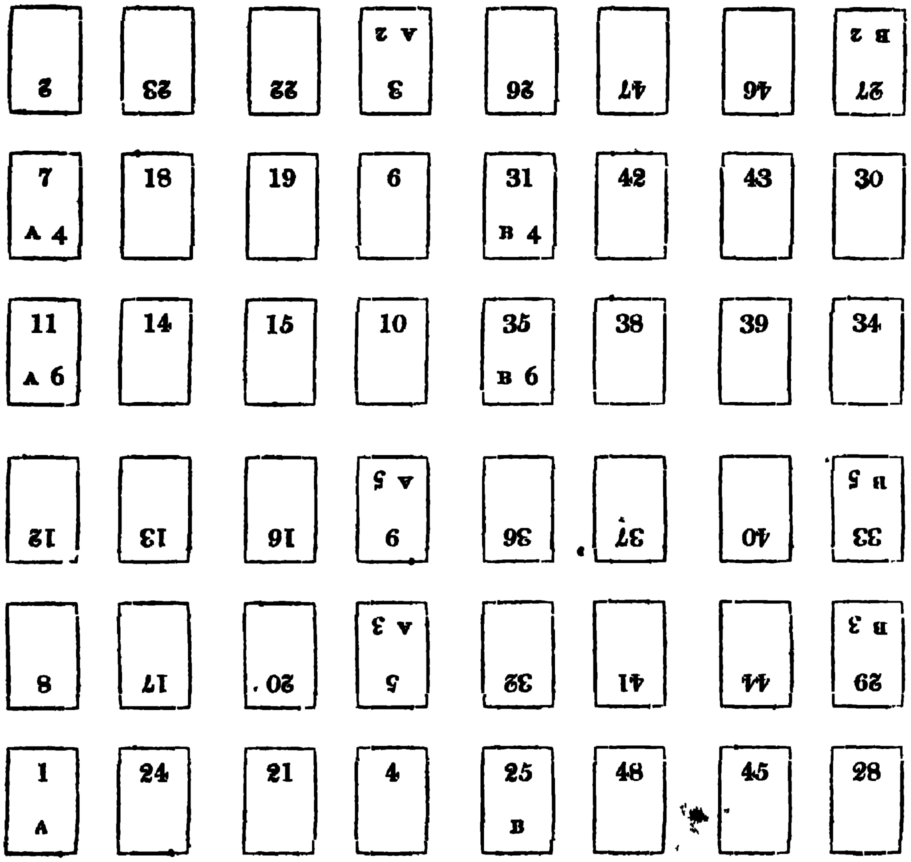
A HALF SHEET OF THIRTY-SIXES, WITHOUT CUTTING.



A HALF SHEET OF FORTIES.

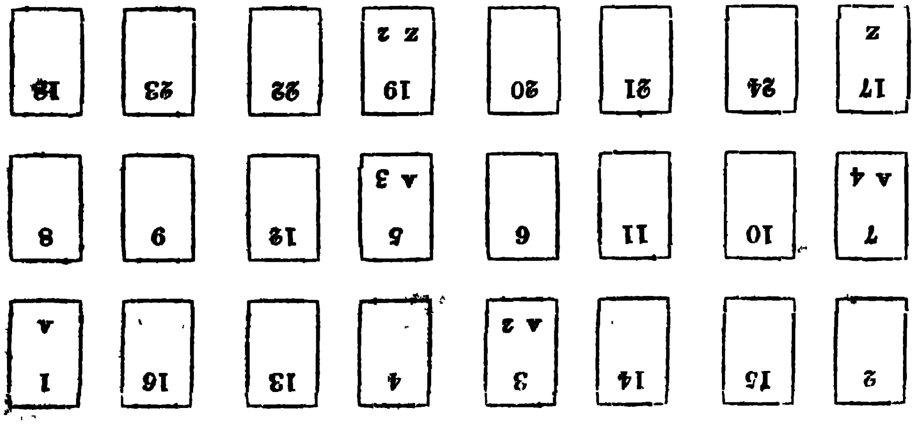


A HALF SHEET OF FORTY-EIGHTS, WITH TWO SIGNATURES.



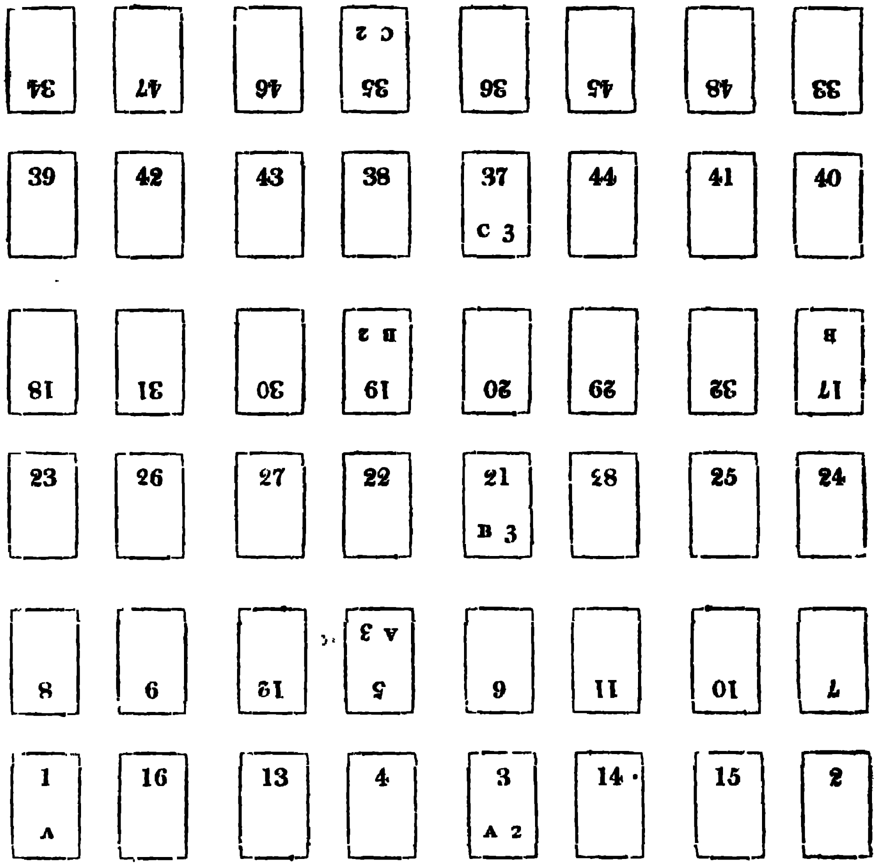
2	23	22	A 2 3	26	47	46	B 2 27
7 A 4	18	19	6	31 B 4	42	43	30
11 A 6	14	15	10	35 B 6	38	39	34
12	13	16	A 5 9	36	37	40	B 5 33
8	17	20	A 3 5	32	41	44	B 3 29
1 A	24	21	4	25 B	48	45	28

A QUARTER SHEET OF FORTY-EIGHTS, WITH TWO SIGNATURES.

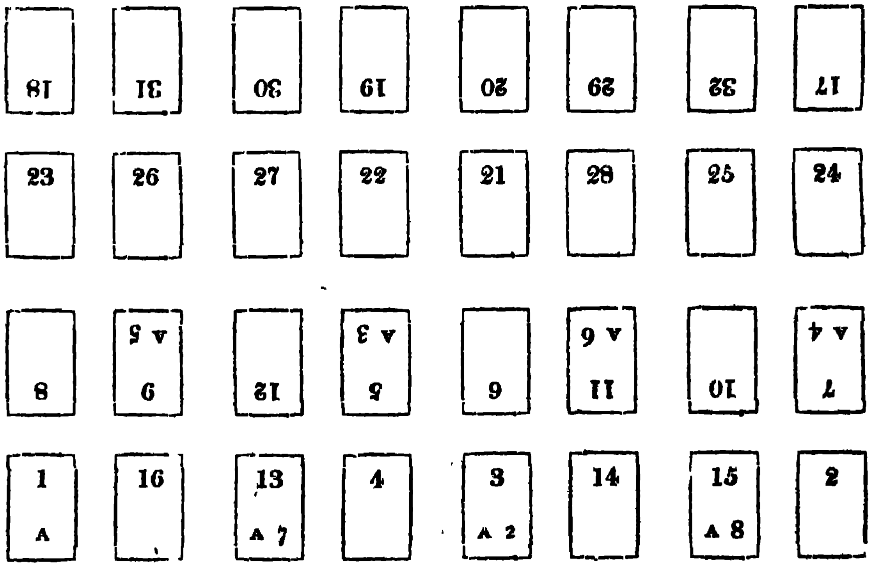


18	23	22	Z 2 19	20	21	24	Z 17
8	9	12	A 3 5	6	11	10	A 4 7
A 1	16	13	4	A 2 3	14	15	2

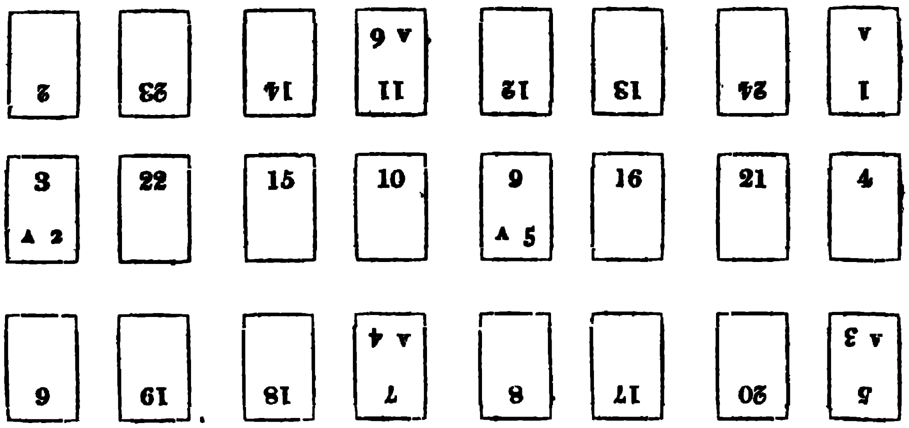
A HALF SHEET OF FORTY-EIGHTS, WITH THREE SIGNATURES.


34 47 46 35 C 2 36 45 48 33
39 42 43 38 37 C 3 44 41 40
18 31 30 19 B 2 20 29 32 17 B
23 26 27 22 21 B 3 28 25 24
8 9 12 5 A 3 6 11 10 7
1 A 16 13 4 3 A 2 14 15 2

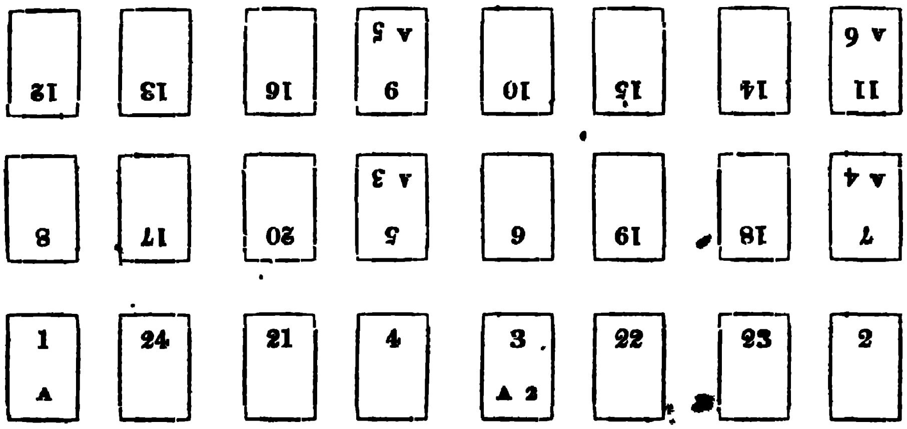
A QUARTER SHEET OF SIXTY-FOURS.


18 31 30 19 20 29 32 17
23 26 27 22 21 28 25 24
8 9 A 5 12 5 A 3 6 11 A 6 10 7 A 4
1 A 16 13 A 7 4 3 A 2 14 15 A 8 2

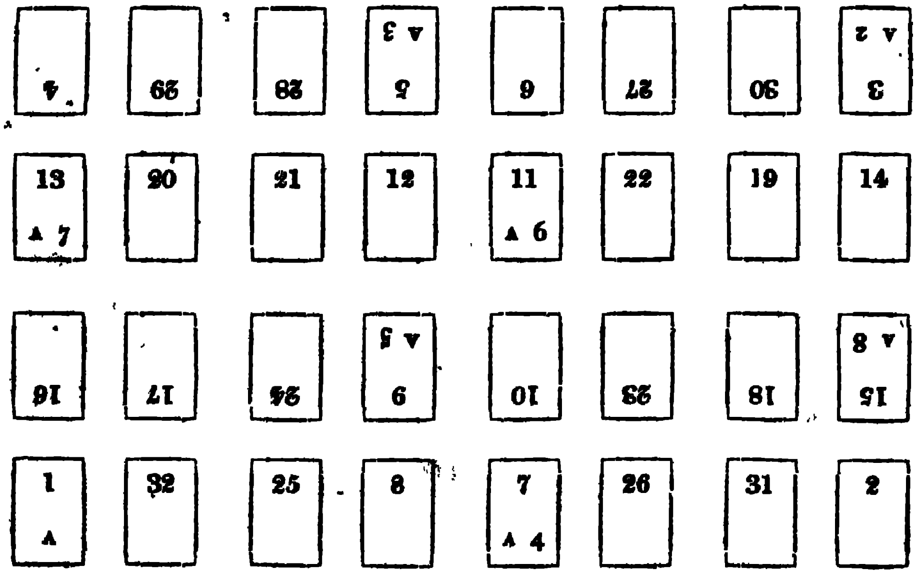
A QUARTER SHEET OF FORTY-EIGHTS, WITHOUT CUTTING.



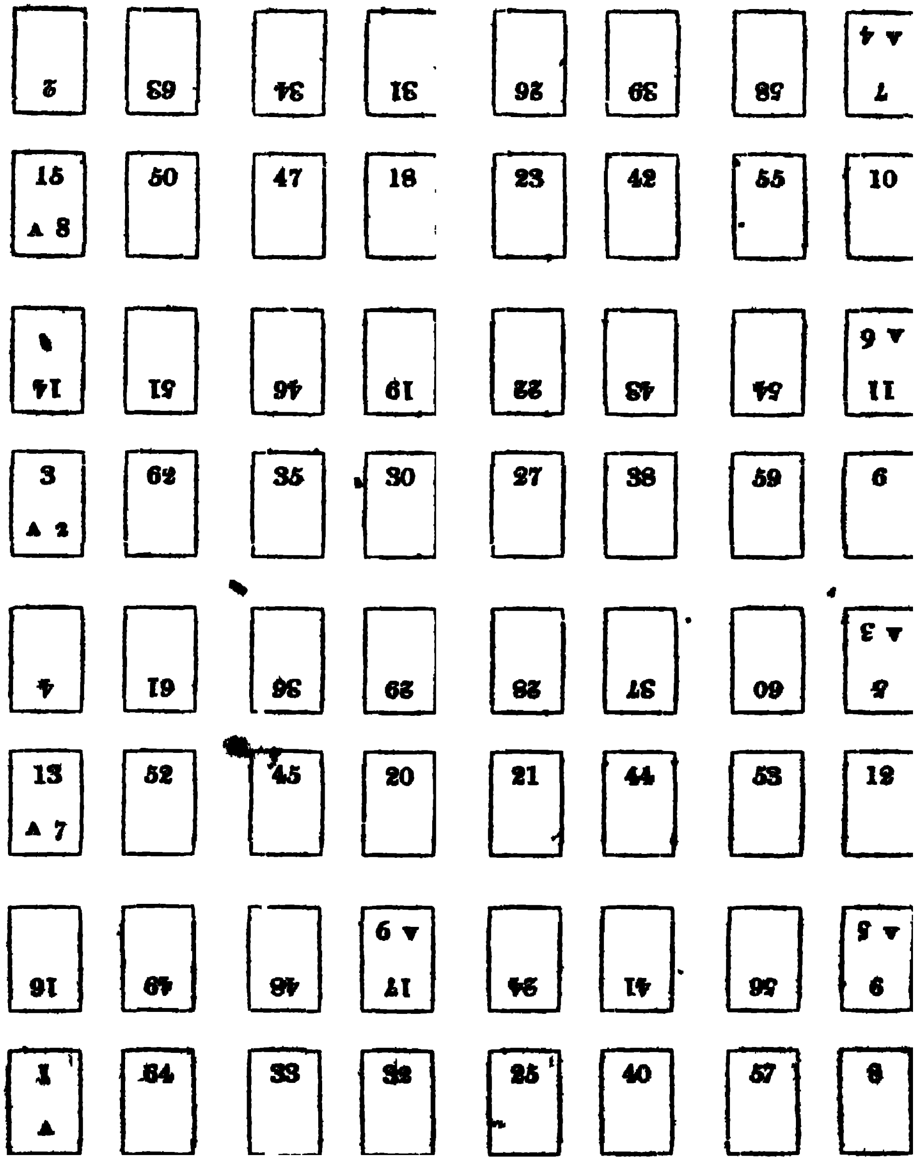
A COMMON QUARTER SHEET OF FORTY-EIGHTS.



A COMMON QUARTER SHEET OF SIXTY-FOURS.

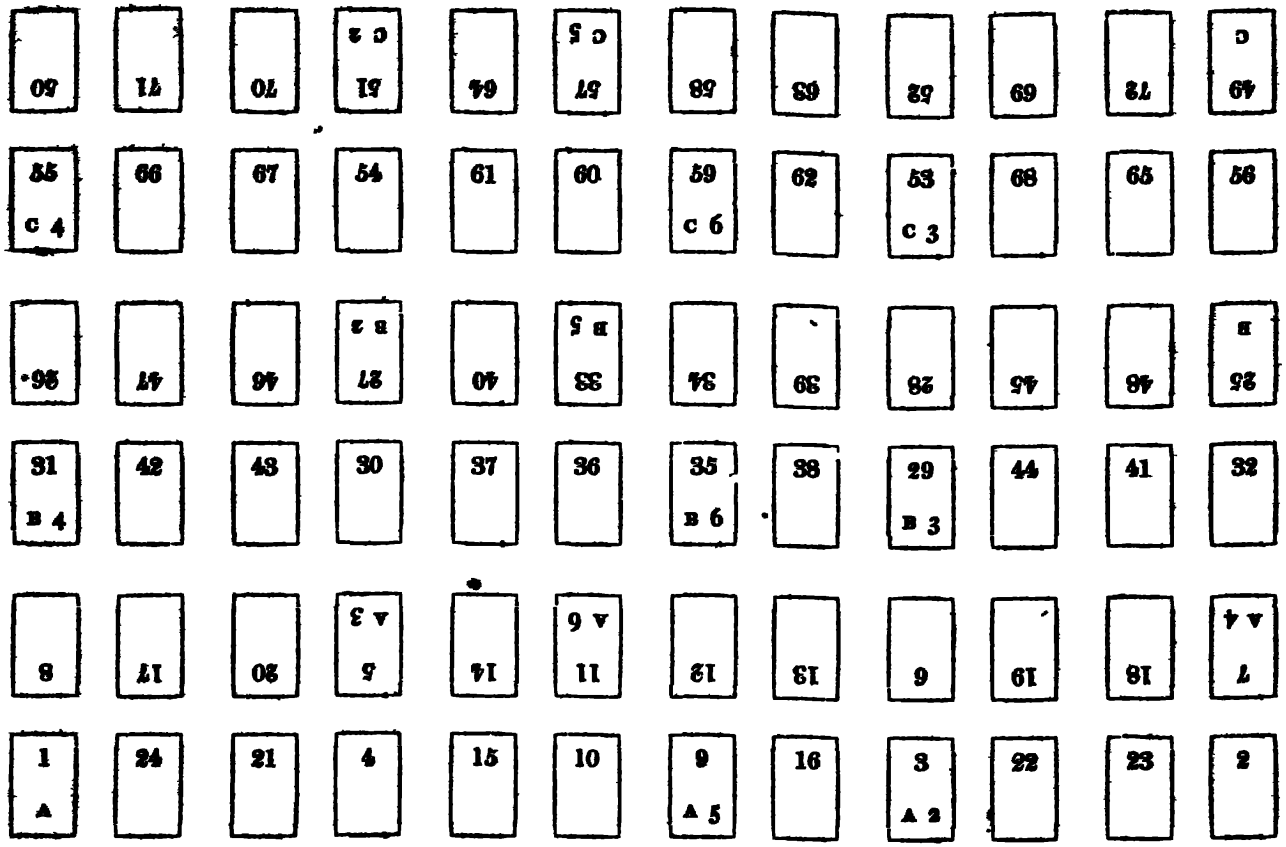


A HALF SHEET OF SIXTY-FOURS.



2	63	34	31	26	39	58	7 A 4
15 A 8	50	47	18	23	42	55	10
14	51	46	19	22	43	54	11 A 6
3 A 2	62	35	30	27	38	59	6
4	61	36	29	28	37	60	5 A 3
13 A 7	52	45	20	21	44	53	12
16	49	48	17 A 9	24	41	56	9 A 5
1 A	64	33	32	25	40	57	8

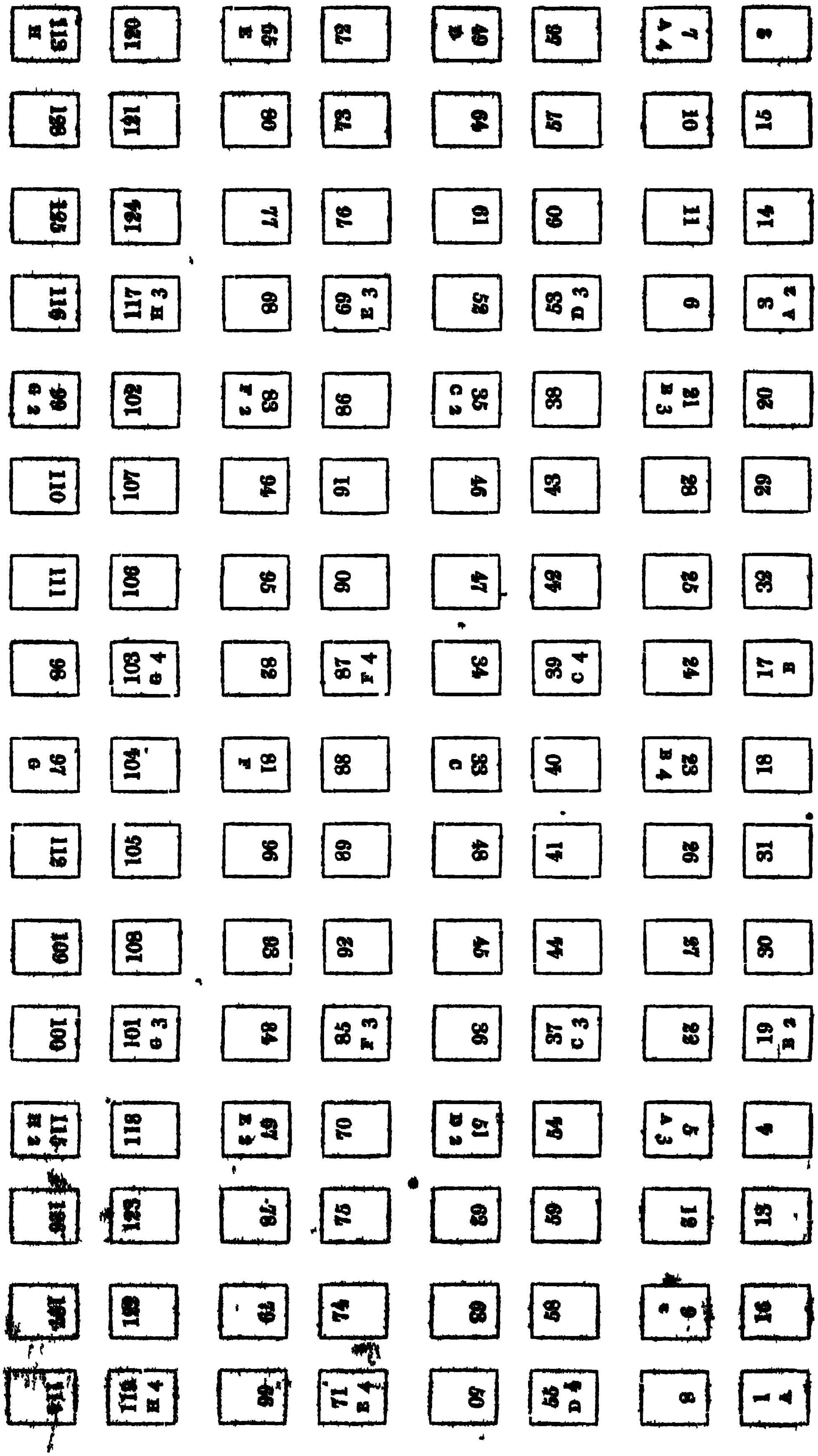
A HALF SHEET OF SEVENTY-TWOS, WITH THREE SIGNATURES.



A HALF SHEET OF NINETY-SIXES, WITH SIX SIGNATURES.

65 E	72	49 D	56	7 A 4	2
80	73	64	57	10	15
77	76	61	60	11	14
68	69 E 3	52	53 D 3	6	3 A 2
83 F 2	86	35 C 2	38	21 B 3	20
94	91	46	43	28	29
95	90	47	42	25	32
82	87 F 4	34	39 C 4	24	17 B
81 F	88	33 C	40	23 B 4	18
96	89	48	41	26	31
93	92	45	44	27	30
84	85 F 3	36	37 C 3	22	19 B 2
67 E 2	70	51 D 2	54	5 A 3	4
78	75	62	59	12	13
79	74	63	58	9	16
66	71 E 4	50	55 D 4	8	1 A

A HALF SHEET OF ONE HUNDRED AND TWENTY-EIGHTS.



113 H	120	65 E	72	49 D	56	7 A 4	8
128	121	80	73	64	57	10	15
125	124	77	76	61	60	11	14
116	117 H 3	68	69 E 3	52	53 D 3	6	3 A 2
99 G 2	102	83 F 2	86	35 C 2	38	21 B 3	20
110	107	94	91	46	43	28	29
111	106	95	90	47	42	25	32
98	103 G 4	82	87 F 4	34	39 C 4	24	17 B
97 G	104	81 F	88	33 C	40	23 B 4	18
112	105	96	89	48	41	26	31
109	108	93	92	45	44	27	30
100	101 G 3	84	85 F 3	36	37 C 3	22	19 B 2
115 H 2	118	67 E 2	70	51 D 2	54	5 A 3	4
126	123	78	75	62	59	12	13
127	122	79	74	63	58	9	16
114	119 H 4	66	71 E 4	50	55 D 4	2	1 A

The preceding schemes will be found to contain every necessary or usual form of imposition, consisting of folios, quartos, octavos, twelves, sixteens, eighteens, &c. together with many irregular sizes, viz. twenties, thirty-sixes, forties, forty-eights, sixty-fours, seventy-twos, ninety-sixes, and one hundred and twenty-eights; these, and many more irregular sizes may be made, with a view to shew the possibility of folding a sheet of paper into so many various forms. We have also given a plan for imposing a half sheet of eighteens without transposing the pages on the press, which will be found extremely useful, as works in that size are now constantly printing. Much time will also be saved in the warehouse work, for it will now only be necessary to cut the sheet through in the middle, in the same manner as a half sheet of octavo; but then, in each half sheet, there will be three single leaves.

It is necessary, before we proceed further on the subject of imposing, to make a few observations on the method of tying up a page, which is done with a piece of fine packthread, called by the makers "sealing twine," turned four or five times round it, and fastened at the right-hand corner, by thrusting a noose of it between the several turnings and the matter, with a piece of brass rule, and drawing it perfectly tight; taking care, during the whole time, to keep the fore-finger of the left hand tight on the corner, to prevent the page from being drawn aside when the cord is strained.

The page being tied up, the compositor removes it pretty far from the ledges of the galley, to see if the turns of cord lie about the middle of the shank of the letter; if they lie too high, as most commonly they do, he thrusts them lower, and, if the page be not too broad, he places his fore or middle finger, or both, of his right hand, on the right side of the page, and his thumb on the left; then, bending his other fingers under the head of the page, he places it over the page-paper, as he means to discharge the page in that, placing the fingers of his left hand about the foot of the page, upon the ends of the lines on the right-hand side, and his thumb on the left-hand side, with the palms of his hands towards the face of the letter, and his other fingers bent under the foot of the page, with the face of the letter from him, and letting it rest upon the inside of his fingers, under the right-hand side of the page, he takes a page paper into the palm of his left hand, and puts it against the bottom of the page, and turning his left hand outward, receives the page flat upon the paper on the palm of his hand; then, with his right hand grasps the sides of the page and the paper which turns up again above the bottom of the page, and sets it in a convenient place under his frame, placing it on the left hand, with the foot towards him, that the other pages which are in like manner set down afterwards, may stand by it in an orderly succession until he comes to impose them.

If it be a large folio page he has tied up, which he cannot take into his hands, because it is too broad for his grasp, he carries his galley and page to the imposing stone, and then turns the head of the galley towards him, and placing the ball of the thumb of his left hand against the inside of the head of the page, to hold it and keep it steady, with a quick motion draws away the galley, when the page falls upon the paper.

To return to the subject of imposing:—sixteens, twenty-fours, and thirty-twos, are but octavos and twelves doubled, or twice doubled, and imposed in half sheets. For example, the sixteens are two octavos imposed on each side the short cross; the twenty-fours are two twelves imposed on each side the long cross, and a thirty-twos is four octavos imposed in each quarter of the chase. And thus a sheet is doubled as often as thought necessary. But as we said before, they are imposed on each side the cross, or in each quarter of the chase, as the sheet that is doubled or redoubled is imposed in the whole chase.

In half sheets, all the pages belonging to the white paper and re-iteration are imposed in one chase. So that when a sheet of paper is printed on both sides with the same forme, that sheet is cut in two in the short cross, if quarto or octavo, and in the short and long cross, if twelves, and folded as octavo or twelves.

When a compositor proceeds to impose, he takes up the pages he set by on papers in an orderly succession when he tied them up, grasping the edges of the papers on both sides of the page tightly, that so the bottom of the paper may stand the stronger against the bottom of the letter, to keep it from falling out; and bringing it thus to the correcting stone, he turns the flat part of his left hand on the face of the page, with the thumb on one side, and little finger on the other, the three fingers being extended on the page to keep it from springing up; then taking hold of the page-paper with the right, and at the same time easing the weight of the page with the left hand, he carefully draws away the paper, and places the page in its proper position on the stone. In this manner he lays down all the pages of the forme.

The pages for a forme being put down, we follow them by the folios and catch words, if any are used, to see they are laid down rightly. In close and ordinary matter we take notice, first, whether the uneven outer pages have their proper signatures; then, for further proof, count whether the number of an outside page, and the number of the page next to it, amount to one more than there are pages contained in a sheet or half sheet of our work. Thus, for example, in folio, one and four make five; in quarto, one and eight make nine; in octavo, one and sixteen make seventeen. In this manner we may examine every two pages in all other sizes, whether their joint number exceeds the number of pages in a sheet by one; which, if it does, is a proof that the pages are in their right places.

Being sure that our pages are laid down right, we proceed to dressing of chases, which we will suppose to be for a sheet of octavo. Accordingly we endeavour to come at a good pair of chases, that are fellows, as well in circumference as in other respects; and having laid them over the pages for the two different formes, we consider the largeness of the paper on which the work is to be done, and put such gutter-sticks betwixt page and page, and such reglets along the sides of the two crosses, as will let the book have proper margins after it is bound. Having dressed the inside of our pages, we proceed to do the same to their outsides, by putting side-sticks and foot-sticks to them, and when properly secured by the furniture, we begin to untie them, quarter after quarter, the inner page first and then the outer, driving at the same time the letter towards the crosses, and using every other means to prevent it from hanging or leaning; for which purpose, and to keep it from other accidents, we secure the pages of each quarter by a couple of quoins.

By observing a proper method in cutting up new furniture, the same will be serviceable for other works, as well as the one for which it is intended, even though the size of the page may differ, provided it agrees with the margin of the paper. The gutters should be cut two or three lines longer than the page; the head-bolts wider; the back furniture may run down to the rim of the chase, but must be level with the top of the page, which will admit of the inner head-bolt running in; the difference of the outer head-bolt may go over the side-stick, and the gutter will then run up between them. The foot-stick only need be cut exact, and the furniture will completely justify.

The pages of a sheet or half sheet being now dressed, our next business is to make the margin, or to try whether our furniture is so proportioned as that each page may occupy one side of a leaf, so as to have an equal margin of white paper left at the sides as well as at the head and foot thereof.

The method of making margin by rule, is practised by no other printing nation besides the English; and it would be in vain to persuade printers and booksellers in foreign parts to come into our measures, as to making margin; since they would disoblige the literati were they to deprive them of a large margin, on which to make their remarks.

To make proper margin, some use the following method, for octavos; viz. they measure and mark the width of four pages by compasses, on a sheet of paper designed for the work, beginning to measure at the one extremity of the breadth of the sheet. The rest of the paper they divide into four equal parts, allowing two-fourths for the width of two separate gutter-sticks; the remaining two-fourths they divide again into four equal parts, and allow one-fourth for the margin along each side of the short cross, and one-fourth for the margin to each outside page. But because the thickness of the short cross adds considerably to the margin, they reduce the furniture in the back accordingly, and thereby enlarge the outside margin, which requires the greatest share, to allow for the unevenness of the paper itself, as well as for pressmen laying sheets uneven, when it is not a fault in the paper. Having thus made the margin between the pages, to the breadth of the paper, they proportion the margin at the head, in the same manner, to the length, and accordingly measure and mark the length of two pages, dividing the rest into four parts, allowing one-fourth for each side of the long cross, and one-fourth for the margin that runs along the foot of the two ranges of pages. But though they count each part equal to another, it does not prove so upon examination; so they lessen the furniture on both sides of the long cross, as they did at the short cross, to enlarge the bottom margin, for the same reasons that were assigned for enlarging the side margin.

"This being the method used in making margin to octavos, they go the same way to work for the same purpose in twelves; where the chief care is to fix upon a proper size for the head-sticks or bolts; and, according to them, allow in the following manner; viz. for the outer margin along the foot of the pages, the amount of two-thirds of the breadth of the head-sticks, and the same for the inner margin, that reaches from the foot of the fifth page to the centre of the groove for the points; and from the centre of that groove to the heads of the pages of the off-cut, they allow half the breadth of the head-stick. As to the margin along the long cross, it is governed by the gutter-sticks; and it is usual to put as much on each side of the long cross as amounts to half the breadth of the gutter-stick, deducting scarcely any thing for the long cross, as that allows for the outer margin—exposed to the mercy both of the pressman and book-binder.

Thus much may suffice as to making margin in the above way;* which, though it differs from that used by others, is nevertheless the basis for making a proper division of the paper."

The most easy and approved practical method now in use is as follows: having provided your chases, see that the crosses are well fitted in the mortises, and free from any remains of old scaleboards or lumps of rust. Lay the chase over the pages, and get a sheet of the paper intended to be used for the work out of the wet heap; or if it has not been previously wet, have a sheet put into another wet heap; by this precaution more certainty is obtained than by guessing at the allowance to be made for the expansion of the paper in wetting, and which varies in some degree in different papers. Fold this sheet to the intended size of the book, say octavo; then lay the back, or folded part of the paper against the side of an inner page, and stretch it over the right-hand, or outer page, moving that page so that its outside, and the extremity of the paper, nearly correspond. Being provided with two or three metal quotations, try the space thus left between the two pages as to what gutter-stick must be provided; whether it will take a double-narrow, double-broad, broad-and-narrow, two-broads-and-narrow, &c. &c., such being the technical names of the furniture as described p. 482; and you have only to fix the name of the width wanted, and give the length in inches, or by a piece of scaleboard or reglet, to enable the printer's joiner to suit you with gutters. It is better to have them half a line shorter than the page, to prevent any accident of binding; and to have at one order a sufficient number for the sheets of letter of the work that you mean to have in chase. Many houses, to avoid delay in sending to the joiner, keep an assortment of gutter furniture in yard lengths; and by the use of the saw and saw-block furnish their own gutters; and in time acquire such an assortment as not to have to cut for every new work. The gutters being provided, the next care is, to supply the backs and head-sticks. To do this, place a gutter, or the quotations, between two pages on each side of the cross, resting lightly on the page-cords: then open the paper to quarto; and placing the inner or folded edge against the side of the page next to one side of the cross, stretch it over the two pages and gutter on the other side of the cross, moving the pages so that the outside, or fore-edge of the paper reach exactly to the extremity of the outer page, and the distance at which the sides of the two inner pages will then stand from the cross, will indicate the furniture necessary on each side of the cross; as, broad, narrow, two-line-english, &c., and any difference yet remaining must be made up by reglet, scaleboard, &c. The head and foot margins are made by similar process; laying the paper from the head-line of one page, over and to the foot-line of the opposite, will show what is necessary to be put on each side of the long cross in octavo; and those for the short cross, in duodecimo, as well as the bolts, will be regulated by the same means. It is desirable that the gutters should be rather under the full gage or extent of the paper before described, in order to allow a greater proportion in the backs, as when the sheet is folded these form the fore-edge, which is subject to the contribution to the bookbinder's shaving-tub, to which the margin formed by the gutters is not liable; and if nothing was allowed on this account, the outside margin of a bound book would be less than the inner. One or two scaleboards ought also to be put on each side of the crosses, to assist the pressman in making register when the pages do not back perfectly, either from the chases or cross not being truly square, or from unequal locking up, or inequality in the furniture, or from the shrinking of the paper between the time of working white-paper and reiteration. To satisfy yourself more fully that all is correct, or that you have dressed margin out-and-out, unfold the sheet, and laying the middle fold to coincide with the middle of the short cross, see that the other folds all fall exactly upon the middle of the several gutters; or, if duodecimo, of the heads and bolts, &c.; and if these foldings fall upon the middle of their respective parts of the furniture, it proves that the margin will, when folded, be right throughout; but if the foldings do not coincide with the lines, which they ought to do, then as much more scaleboard, &c. must be added to the backs, heads, or elsewhere, as is wanted to regulate every position. The chases being now dressed, and the proper margin made, nothing remains but quoining and locking up the formes.

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* I have preserved the above method, as copied by Mr. Stower from Luckombe, for the benefit of those compositors, if any, who are able, or choose to perform an otherwise simple operation, in a truly mathematical method; but I suspect the result of this mode will frequently remind him of the manner in which a man is measured for his clothes by the taylors in Dean Swift's island of Laputa.

All that has been said concerning making of margin, relates properly to imposing the first sheet of a work; for after that is truly dressed, a second, or more sheets, may be dressed with less trouble; as when we impose from wrought-off formes, we have nothing to do but to put the chase with the furniture and quoins about the pages, in the same manner as we take it off from the forme we are stripping.

In order to be accurate in altering the folios of the respective pages, according to their regular succession, we have arranged in the appendix a copious table of signatures and folios.

We next proceed to locking up our formes; first carefully examining whether the pages of each quarter are of an exact length, for the difference even of a lead will cause them to hang. We ascertain their exactness by placing the ball of each thumb against the centre of the foot-stick, raising it a little with the pressure, and if the ends of both pages rise equal with the stick, it is a proof they will not bind; we then fit quoins betwixt the side and foot stick of each quarter, and the chase, till the whole forme may be raised. And though locking up a forme may be thought a trifling matter, it demands our attention nevertheless in several instances. When we have pushed the quoins as far as we can, with our fingers, we begin the use of the mallet and shooting-stick, and drive the quoins gently along the side-sticks at first, and then those along the foot-sticks, taking care to use an equal force in our strokes, and to drive the quoins far enough up the shoulders of the side and foot sticks, that the letter may neither belly out one way, nor hang in the other; and as to the lower quoins, they ought likewise to be driven to a station where they may do the office of keeping the letter straight and even.

Our forme, or formes, being now locked up, and become portable, we deliver them to the proof press, and it becomes the duty of the pressmen to pull a proof of them. But here we must notice an impropriety that prevails with some pressmen, in turning the term of *first* proof into that of *foul* proof, and too generally pulling the proof accordingly; whereas the slightest knowledge of printing, or indeed common sense, should be sufficient to show that a proof sheet ought to be pulled as clean and as neat as any sheet in a heap that is worked off. Hence it is a rule with careful pressmen, not to give proofs a high colour, nor to use very wet paper for them, but instead of these easements to give them a long and slow pull, that the matter may come off clean and fair, so that every letter may appear full and plain; after which the formes are rubbed over with a wet lye-brush, then carefully taken off the press, and the proof and formes delivered to the compositor's further care.

On the best means of expediting Bills in Parliament, Pamphlets, and other Works of a temporary and urgent nature.

A judicious distribution of the employment of workmen in every kind of business, is the only means of expediting it. This observation applies very forcibly to the printing business. Pamphlets, and other works of a temporary nature, it is sometimes necessary to print in the course of a few hours; to accomplish this the utmost exertion, accompanied with skilful management, is requisite: we shall, therefore, lay down a plan which we conceive will be found fully to answer this purpose.

As soon as a work of this nature is put in hand, it must be the business of the overseer to select such men as are able to complete the greatest quantity of work in a given time. We will suppose eight men are ordered to distribute letter for it. Their first concern must be, to appoint one from among them who thoroughly understands his business, and is in other respects qualified to undertake the management of the work, to make it up, and to do every thing which interferes with the regular business of distributing, composing, and correcting.

Having done this, let them proceed to the distribution of their letter; while the *clicker*, or person appointed to manage the job, applies to the overseer for the copy, receives instructions respecting it, and procures leads and every other necessary sort. He then draws out the following table:

Compositors' Names.	Folios of Copy,	Lines Composed.	Memorandums.

In the first column he sets down the name of each compositor when he takes copy; and, in the second, the folio of the copy, that he may be able to ascertain instantly in whose hands it lies. In the third column he notes down the number of lines each man has composed, opposite to his name, as fast as the gallies are brought to him. In the fourth, he sets down such remarks respecting the copy, &c. as may be necessary, and also any circumstance that may occur in the companionship.

By this means each compositor will receive a share of the amount, according to the number of lines he composes, and the clicker must have an equal share with the person who sets the greatest quantity: or it may be done by limiting the quantity each man is to compose in an hour; whoever is deficient in this quantity must suffer a proportionate deduction from his share of the work.

When the members of the companionship are ready for their first taking of copy, they are to receive it from the clicker in pieces as short as possible, taking care that the two first have shorter takings than either of the others, to prevent as much as possible, any delay in the making up. During the time the first taking is in hand, the clicker sets the half-head, head lines, white lines, and signature lines, together with side notes, and other extraneous matter.

As soon as the first person brings him his matter, he counts off the number of lines, and inserts them in the table; then gives him another taking of copy, and proceeds with the making-up. The same plan is observed with the rest of the companionship.

When the first sheet is made up, he lays the pages on the stone, and informs the overseer of it, who will then immediately procure chases and furniture.

The work will now proceed rapidly, provided the compositors stick close to their business, and there be no hindrance with respect to letter, &c. which depends on the good management of the overseer. If the clicker find that he cannot make up the matter as fast as it is composed, he should call one of the compositors to his assistance, who must be the person last in copy: In this case he counts the lines he has composed, sets them down in the table, and takes notice of the time he is off, which is to be made up to him by a deduction from the share of each person.

The proofs should be read immediately after they are pulled, and given to the clicker to be corrected. As soon as this is done, he lays up the formes, and gives the proof to the compositor whose matter stands first, who should immediately correct it, then forward it to the next, and so on, till the sheet be corrected; the clicker then locks it up, and carries the formes to the proof-press.

As soon as one of the companionship is out of copy, and there is no more to give out, the lines of the whole must be counted off, and set down in the table, which closes the account, and then every one does as much as he can for the general benefit. If there be not work enough to employ the whole, those who are not wanted may go to their regular work, and the time of their absence, till the rest of the companionship return to theirs, be deducted from their respective shares.

It would save time in making calculations, could the companionship agree to divide the amount of the bill between them in equal proportions, and merely fine those who absent themselves from the office; but as some compositors will set considerably more than others, the above mode will, we conceive, be found to answer best, as it excites a spirit of emulation, and induces them to pursue their work with vigour.

Rules to be observed in Companionships.

THE disputes which frequently arise in printing-offices upon trifling as well as intricate points, can only be settled by a reference to the general custom and usage of the trade. These misunderstandings, which annoy and retard business, often take place in companionships consisting of three or four compositors; it is therefore highly desirable that the generally-received rules and regulations on this subject should be explicitly and clearly laid down for the future comfort and government of the compositor.

Taking Copy.

IF it be printed copy, and the compositor be desired to follow page for page, each sheet, as it is given out, should be divided into as many parts as the companionship may consist of, and the choice of each part, if it materially varies, should be thrown for.* During the absence of either of the companionship, if he be likely soon to return, some one should throw for him, on condition that he will

* Throwing is the ancient game of chance peculiar to a printing-office. Nine m-quadrats having been well shaken in the box made of the two hands placed with the palms facing as hollow as possible, and thrown on the stone, so many of them as come with the nicks uppermost, count in every throw: and three throws generally constitute the game of each thrower. It is sometimes carried on with an earnestness that may bear comparison with the dice and box, and shaking of elbows, at White's or Brookes's: and to cast the chances upon the game in all its possible changes, is a subject that may perhaps sometime engage the attention of such disciples of Hoyle, as are desirous to enlarge the sphere of the goddess of chance. I have seen all the nine thrown nicks upwards, against which it is three to one upon every quadrat; there being, to each piece, three blank sides to one that is indented. But it is not worth while to pursue this subject any further, since the practice in a printing-office, except for purposes of business, ought to be strictly prohibited, as incompatible with *the good of the chapel:* and which prohibition I take care to enforce.

be able to get through this fresh taking, with what remains of the last, so as not to impede the imposition of the sheet.

Another method may be adopted, viz. for each person to agree to receive regularly of the different takings a certain number of pages; but if this plan be followed, the bulk of the copy must not be subject to the inspection of the companionship, but kept by the overseer, and dealt out by him as it is wanted, or it will inevitably cause contention; for the compositor likely to be first out of copy, if he have free access to that which remains unfinished, will observe whether the next taking be *fat* or *lean*—if the latter, he will hold back and loiter away his time, in order to avoid it, and thus materially delay the work. On the other hand, if this taking appear to be advantageous, and there should happen to be two or three of the companionship out of copy at the same time, a sort of scramble will take place who shall have it, which will end in dispute and confusion—on no account, therefore, should the copy be open to examination, unless for the purpose of ascertaining the charge per sheet.

With manuscript copy it will be better to take one from the other in such a manner as not in the smallest degree to delay the imposition, or block up the letter; that is, that no compositor may retain the making-up too long by holding too large a taking of copy. Compositors are apt to grasp at a large portion of copy, with the view of advantage in the making-up, though nine times in ten it will, as before observed, operate as a loss to them, by their eventually standing still for want of letter. If by mistake too much copy has been taken, the compositor should hand a part of it to the person following in the making-up, to set up to himself.

If parts of the copy should be particularly advantageous or otherwise, each of the companionship should throw for the chance of it; the person to whom it may fall, if he have copy in hand, must turn that copy over to him who is about to receive more copy; but for trifling variations from the general state of the copy, it cannot be worth the loss of time necessary to contest it; though it frequently happens that a litigious man will argue half an hour on a point that would not have made five minutes' difference to him in the course of his day's work.

If one of the companionship absent himself from business, and thereby delay the making-up, and there is the smallest probability of standing still for letter, the person who has the last taking must go on with this man's copy, whether it be good or bad.

Making-up of Letter.

THE number of the companionship, if possible, should always be determined on at the commencement of the work, that they may all proceed upon an equal footing. It should be well ascertained that the letter appropriated for the work will be adequate to keep the persons on it fully employed.

If any part of the matter for distribution, whether in chase or in paper, be desirable or otherwise, for the sorts it may contain, it should be divided equally, or the choice of it thrown for.

When a new companion is put on the work after the respective shares of letter are made up, and if there be not a sufficiency to carry on all the companionship without making-up more, he must make up an additional quantity before he can be allowed to partake of any part of that which comes from the press.

Making-up of Furniture.

THE overseer, where one is employed, makes up the first, and indeed, all subsequent *new* furnitures, for the compositors (see p. 534). That is, as far as providing proper chases, gutters, backs, heads, side and foot sticks—the formes are then left to the compositors.

Imposing and Distributing of Letter.

THE person to whose turn it falls to impose, must lay up the forme for distribution; but as continual disputes arise on this subject, and as it can only be ascertained by comparing the number of pages composed, with the number imposed by each person, we therefore recommend their keeping an exact account of these particulars.

It may happen, from one of the companionship absenting himself, that his former share of letter remains undistributed at a time a second division is taking place; under these circumstances, he must not be included in this division. In the event of a scarcity of letter, if any man absent himself beyond a reasonable time, his undistributed matter should be divided equally among his companions, and when he returns, he may then have his share of the next division.

Correcting.

THE compositor, whose matter is in the first part of the proof, lays up the formes on the imposing stone, and corrects. He then hands the proof to the person who has the following matter. The compositor having matter in the first and last part, but not the middle of the sheet, only lays up the formes and corrects his matter; the locking-up is left to the person who corrects last in the sheet.

A compositor having the first page only of the sheet, is required to lay up one forme; also to lock up one forme if he has only the last page.

If from carelessness in locking up the forme—viz. the furniture binding, the quoins badly fitted, &c.—any letters or even pages should fall out, the person who has thus locked up the forme must immediately repair the damage. But if from bad justification, or in leaded matter the letters *ride* upon the ends of the leads, the loss attending any accident from this circumstance must fall upon the person to whom the matter belongs.

It is the business of the person who locks up the forme, to ascertain whether all the pages are of an equal length; and though a defect in this respect is highly reprehensible in the person to whom it attaches (whose duty it is to rectify it), yet if not previously discovered by the locker-up, and an accident happen, he must make good the defect.

Formes will sometimes remain a considerable length of time before they are put to press. When this happens, and particularly in the summer, the furniture is liable to shrink, and the pages will, in consequence, if care be not taken, fall out; it is therefore the business of the person who has locked up the forme, to attend to it in this respect, or he will be subject to make good any accident which his neglect may occasion.

When formes are wrought off, and ordered to be kept standing, they are then considered under the care of the overseer. When they are desired to be cleared away, it is done in equal proportions by the companionship. During the time any formes may have remained under the care of the overseer, should there have been any alteration as to form or substance, such alterations not having been made by the original compositors, they are not subject to clear away those parts of the forme that were altered.

If the pressmen unlock a forme on the press, and from carelessness in the re-locking up, any part of it fall out, they are subject to the loss that may happen in consequence.

The compositor who locks up a sheet takes it to the proof-press, and the pressman, after he has pulled the proof, puts by the formes in the place appointed for that purpose.

Transposition of Pages.

EACH person in the companionship must lay down his pages properly on the stone for imposition. The compositor, whose turn it is to impose, looks them over to see if they are rightly placed; should they, after this examination, lay improperly, and be thus imposed, it will be his business to transpose them; but should the folios be wrong, and the mistake arise from this inaccuracy, it must be rectified by the person to whom the matter belongs. Pages being laid down for imposition, without folios or head-lines, must be rectified by the person who has been slovenly enough to adopt this plan.

THE PRESS.

CHAPTER III.

Construction of the original Printing Press by Blaew of Amsterdam—Perspective and Geometrical Views of every part of the Press—Of Presswork—Practical directions particularly applicable to those Presses—Putting up a Press—Making ready—Inking—Beating, &c.—Pulling—Wetting Paper—Balls—Rollers—Printing in Red, or other Colours with Black—Mixing and grinding Colours with Varnish—Rules and Remedies for Pressmen.

THIS, and the following three chapters, will be appropriated to descriptions of the various machines and apparatus, as far as have come within my knowledge, which from the time of the origin of the art have been devised for the purpose of taking off the impression after all the foregoing described processes have been completed; or, in fact, the *actual printing*. The division of the subject will be according to the order of the invention: first, of those machines which are worked in every part of the process by the judgment and power of men brought up to the business, as a profession; and these, for distinction sake, I have denominated Manual Printing Presses. The second division will treat of Printing Machines, or Engines, in which the art of the engineer is every thing, and the printer, nothing; whether the motive power be that of steam, horse, or man, the impulse to the machinery being unaided or undirected by professional judgment, or any effort of mind.

On the Construction of the Original Printing-Press.

HAVING endeavoured to lay before my readers the necessary information connected with the COMPOSITOR's business, I shall now call their attention to that important branch of the art—the PRESSMAN's—a branch which is the very end and consummation of all the compositor's previous care and labour—a branch which, if in the least degree neglected, will cause all the printer's pains and skill in display, all his expenses in beautiful type and accurate correctors, to be passed over disregarded.*

What is generally termed *fine work*, has been progressively improving since the time of the ingenious Baskerville; and it may with truth be said, that the British press at this moment stands unrivalled for the beauty of its execution; but this, like many other improvements, has had its attendant evils. The wages paid for fine work were generally double, often treble, the amount of those allowed for the common. This great disparity rendered the pressmen careless and indifferent in their execution of common work, which, a few years since was rapidly degenerating, but the emulation and judgment lately called into action, together with the more general adoption of the superior machinery, has brought the art into a degree of creditable repute which it never before possessed. But before the practical directions to the Pressmen are entered upon, it will be necessary to make some observations on the Machine itself, and the various improvements which have lately been attempted upon it.

A press being constructed on principles of mechanism which combine much simplicity and harmony, when kept in proper order by an intelligent pressman acquainted with its principles and operation, is capable of producing a clear and perfect impression; but, unfortunately, few pressmen can be found, possessing mechanical talent or ingenuity, or who feel sufficient interest or due pride in the execution of their work. Unless they are engaged [illegible] established high wages, their aim, generally, is to get through as much work as possible, with little regard to neatness and uniformity.

A perspective representation of the press, as used up to the time of earl Stanhope's improvements, has been given at p. 415; it will now be necessary to exhibit the various parts properly dissected and explained. Mr. Moxon is the first author we have who gave an accurate description of the press, and engravings of its parts. His description was copied nearly *verbatim* by

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* It is a somewhat curious circumstance that one author of a Printer's Grammar never mentions either press or pressmen. See Preface.

Luckombe, and his engravings were perfect fac-similes of Moxon's. Mr. Stower took his description from Luckombe, but accompanied it with newly-drawn cuts, which cuts are given in the present work; and as to the description, it required but very little amendment. It is somewhat remarkable, that the name of every part of the press—the technical terms used—and operations described, remain the same to the present day as in Moxon's time. I do not know of even a new part, or new term having been introduced till the iron press of lord Stanhope had been invented, when the coffin, plank, and stone were dispensed with, and the part substituted was designated as "the table"—the cheeks, head, feet, and rails, also, having been abandoned for an iron frame-work, capable of sustaining all the action of the mechanism, was termed "the staple"—the ribs and cramps became "the slides"—the bar and handle resolved themselves into "the lever and coupling bar," &c. &c.

Various alterations and improvements in the construction of this press have taken place since the introduction of the art of printing into this country. William Jansen Blaew, about the year 1620, made considerable improvements in it, which were generally adopted throughout Holland several years before they were introduced among us. The press was, at one time, in the early age of typography, rather a fashionable (and could there be one more appropriate?) ornament to the frontispiece of a book, having been adopted by a number of printers. From the fac-similes of these engravings, as given by Mr. Dibdin, we may gather some idea of the rude construction of this machine about a hundred years before Blaew.—See Decam. vol. ii, day vi, pp. 118—121.

This ingenious artist was an eminent printer at Amsterdam, and also famous for his astronomical and geometrical productions. In the early part of his life he was bred up to joinery, in which employment he served an apprenticeship. Being of an inquisitive disposition, he rambled to Denmark, about the time the famous Tycho Brahe established his astronomical observatory, by whom he was entertained, and under whose instruction he was employed in making mathematical instruments, which curious art he greatly improved; and it was generally reported that all or most of the sidereal observations published in Tycho's name, were made by Blaew, as well as the instruments.

Before these observations were published to the world, Tycho to gratify Blaew, gave him the copies of them, with which he went to Amsterdam, and there practised the making of globes according to those observations. As his trade increased, he found it necessary to deal in geographical maps and books, and became so particularly curious in his plates, that many of the best globes and maps were engraved by himself; and by his frequent connexion with the printing of books, got so good an insight into the practical part of the art, that he set up a printing-office; he here soon found the inconveniences attending the structure of the old presses, which induced him to contrive remedies, and in that succeeded so much to his expectation, that he caused nine of them to be made, which he named after the nine Muses.

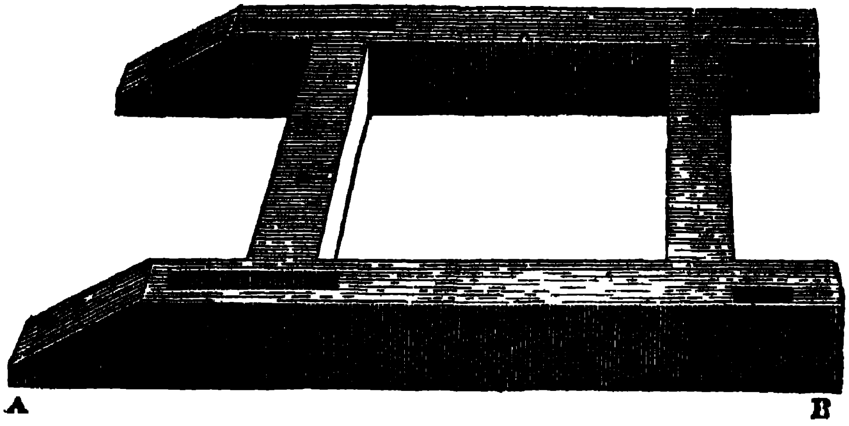
The excellence of the improvements soon became known to other printing-offices, which induced their proprietors to follow Blaew's example, so that presses of his construction became, in the course of a few years, almost general throughout the Low Countries, and from thence, notwithstanding the opposition of the ignorant, were introduced into England.

Many improvements were made subsequently on Blaew's press. The engraving before referred to is an accurate description of the common press, which has been in use from the time of Moxon. It consists of the following parts:

Feet,
Cheeks,
Cap,
Winter,
Head,
Till,
Hose,
Garter,
Hooks,
Spindle,
Worm,
Nut,
Eye of the Spindle,
Shank of the Spindle,
Toe of the Spindle,
Platten,
Bar,
Handle of the Bar,
Hind-posts,
Hind-rails,
Wedges of the Till,
Carriage,
Outer Frame of the Carriage,
Iron Ribs,
Wooden Ribs on which the Iron Ribs are fastened,
Stay of the Carriage,
Coffin,
Plank,
Gallows,
Tympans,
Frisket,
Points and Point Screws.

These are the names of the different parts of the press; but, to convey a more perfect idea of its construction, perspective and geometrical views of the principal parts are here given in the order in which a press is generally put up.

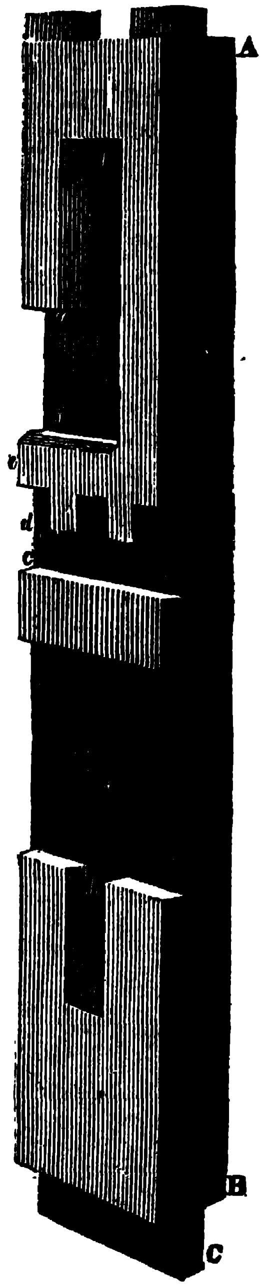
Fig. 1.—*The Feet.*



(The measurements will be understood to be feet and inches.)

The feet are 3 : 1 long, A to B, and 0 : 5 square; the distance asunder, 1 : 10. 0 : 3¾ from each end, the mortise holes are made on the middle of the breadth of the upper side of the foot, for receiving the tenons of the cheeks and hind-posts. The mortise holes for the cheeks are 0 : 8 long; those for the hind-posts, 0 : 2½, and 1 : 7 asunder. For the sake of ornament, the ends are bevelled off according to the taste of the joiner, but care should be taken not to weaken them by so doing.

Fig. 2.—*The Cheeks.*

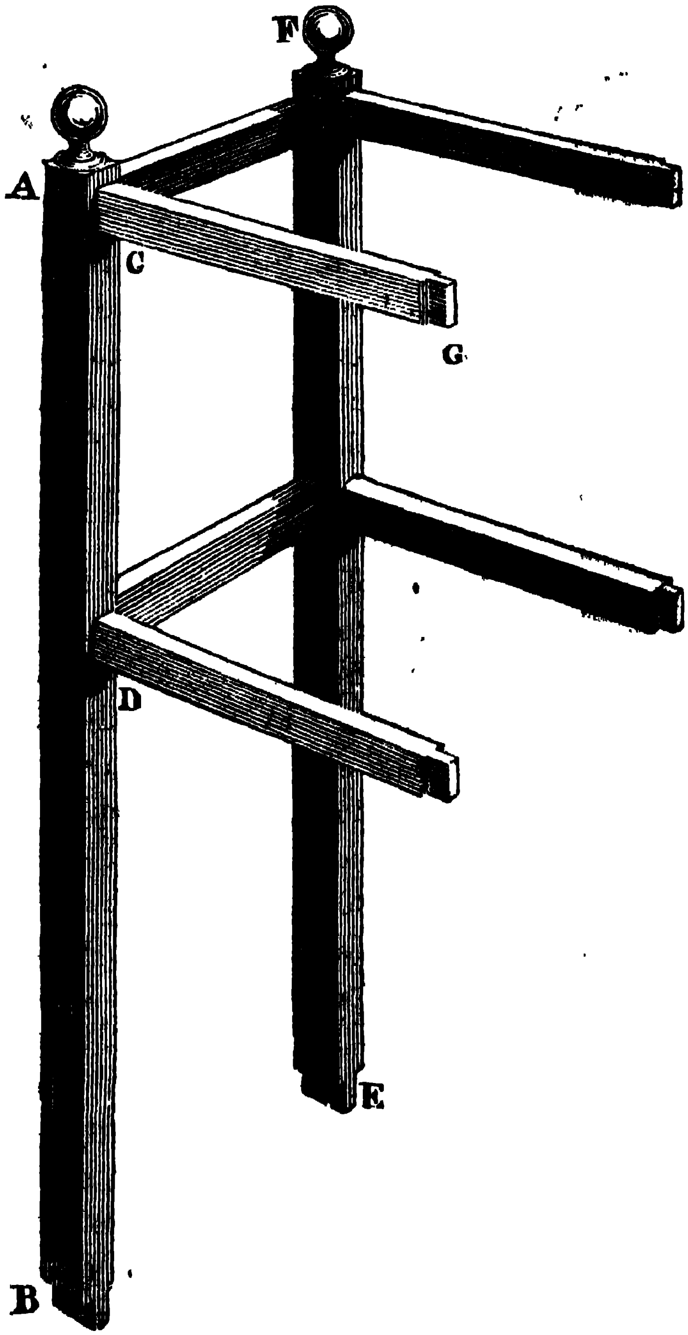


The cheeks are 6 : 1 long, A to B; 0 : 8½ broad, and 0 : 5 thick, with a tenon at each end. The lower tenon C, enters the fore part of the foot, and is cut 0 : 8 long, and 0 : 3½ deep, B C, to fit the mortises. The tenon L, at the upper end of the cheek, is cut across the breadth, and enters the cap within half an inch of the top.

The cheeks and the feet are fastened together with two wooden pins, distant from each other about 0 : 3. 2 : 11 from the bottom of the cheek, one half of the thickness, E to F, of 1 : 1 long, is cut away, to admit a free passage for running in and out the coffin. In the middle of the lower shoulder of this cutting-away, is a mortise of 0 : 7½ long, and 0 : 3 wide, *a b*, in which is fitted a tenon made at each end of the winter. 0 : 4 from the upper part of this cutting away, another is made, *c d*, of the same depth, 0 : 2½ long, to admit a block 0 : 2½ thick, of the width of the cheek, on which the till rests. Above this, two mortise holes are made, *d e*, 0 : 2½ long, corresponding with the tenons at the end of the till.

0 : 3 above the till, another piece is cut away, I K, 0 : 9½ long, and 0 : 4 wide, half through the breadth of the cheek, to admit the depth of the head. Just above this cutting-in, is made a square mortise in the middle of the cheek, *g h*, 0 : 2 wide and 0 : 8 long, for the tenons of the head to play in. These proportions being observed, D E will remain 1 : 10; F G, 0 : 4; G H, 0 : 5; H I, 0 : 3; K L, 1 : 2½.

Fig. 3.—*The Hind Posts and Rails.*

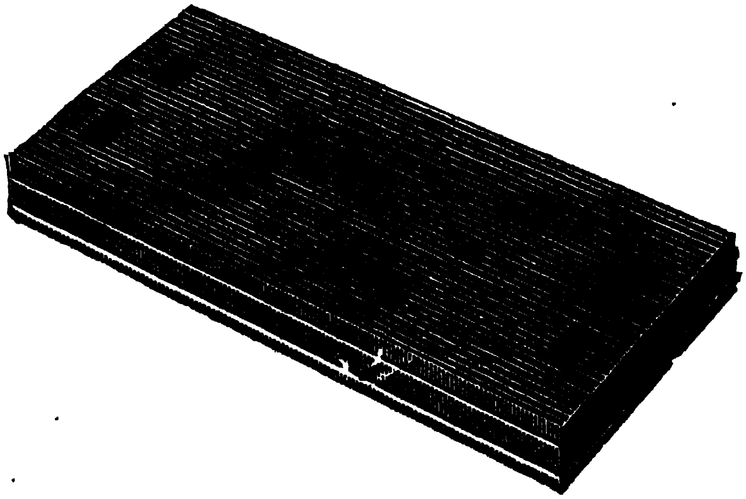


The height or length of the posts, from A to B, 4 : 2; their distance asunder, from A to E, 2 : 2; length of the rails, from C to G, 1 : 6; their distance asunder, from C to D, 1 : 3½.

Six rails are fitted into the hind-posts, two of them behind, and two on each side; one of the hind-rails to be placed 0 : 2 from the top, the other level with the upper side of the winter. These two rails are tenoned at each end, and made so long that the posts may stand even with the cheeks. These tenons are let into mortises made in the insides of the hind-posts, and fixed in with wooden pins.

The side-rails are tenoned at each end, and let into the mortises made in the cheeks and hind-posts, and fastened in the same manner by the hind-rails.

Fig. 4.—*The Cap.*



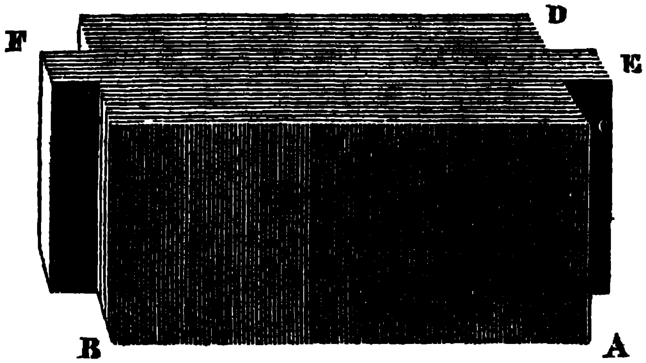
The cap is 3 : 0 long, 0 : 11 wide, and 0 : 4 thick. The front and two sides are ornamented with a neat moulding; the front projecting about an 0 : 1½, and the sides 0 : 3½, over the cheeks.

About 0 : 3 from each end, two mortise holes are made, to admit the tenons of the cheeks; also two holes through which the head bolts pass.

In the centre of the lower hind-rail, a strong leather strap is either nailed or fastened with a screw, the other end being fastened in a similar manner, to the coffin (fig. 17), this is called "the stay girth," its purpose being to stay the coffin from running too far out, or off of the ribs.

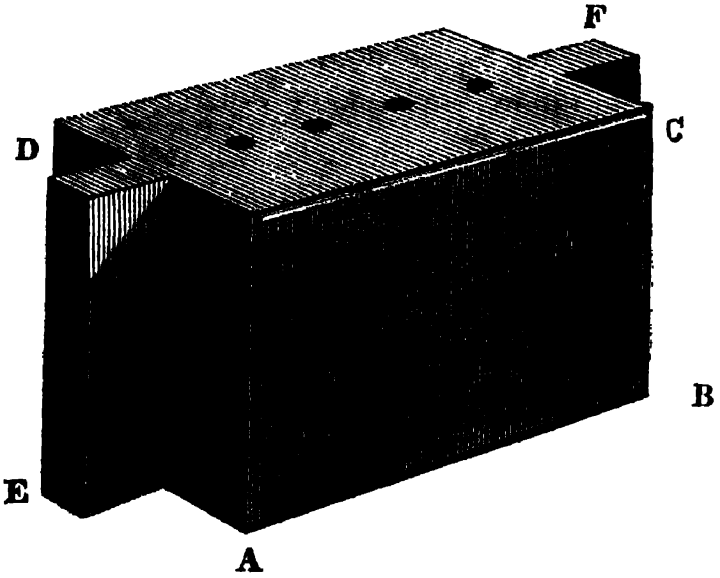
On the top side-rails and hind-rail, the back-board is placed, for defending the ribs from dirt, and also affording a convenient shelf for the pressmen.

Fig. 5.—*The Winter.*



The length of the winter, A B, exclusive of the tenons, is 1 : 11; the width, C D, 0 : 9½; the depth, A C, 0 : 9. The projection of each of the tenons, E F, is 0 : 2. These tenons are made the whole depth of the winter, to fit and fall into the mortises in the cheeks.

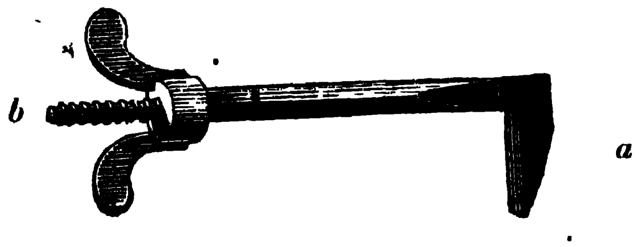
Fig. 6.—*The Head.*



The length of the head, A B, exclusive of the tenons, is the same as the winter, viz. 1 : 11; the width, A E, 0 : 9, and the depth, B C, 0 : 10½. The projection of the tenons, D F, 0 : 2. The front of the head projects ½ in. over the range of the front of the cheeks. The tenons, like the winter, are also cut from the top to the bottom of the head, and made to fit easily into the mortises in the cheeks.

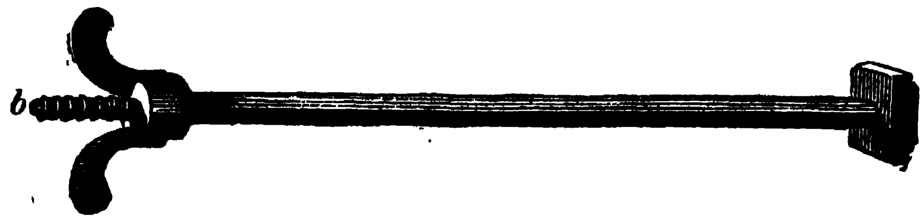
In the centre of the bottom of the head, a hole is cut about 0 : 4 square and 0 : 3½ deep, to admit the brass nut in which the screw of the spindle works. This nut is secured and kept in its proper place by means of iron bolts, about ¾ in. square and 0 : 9½ long, which go quite through the head, having at their ends a hook *a*, turned square, to clasp upon the under side of the nut. At the top of these bolts there are screws *b*, that project about an inch above the head, which, by the help of nuts and washers draw the hook of the bolts close against the nut, and thereby keep it in a fixed and perpendicular position.

Fig. 7.—*The Nut-bolt.*



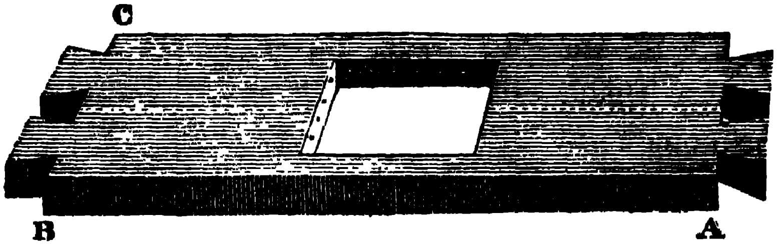
In the centre of the top of the head, a small round hole is bored, to admit oil into the nut and spindle when necessary.

Fig. 8.—*The Head-bolt.*



0 : 3 from each end of the head, two bolts pass through that and the cap, of 1 : 8 in length, and about ¾ in. square. These bolts have a square head, *a*, which stop against, and are let in level with the under side of the head. They have coarse screws at the top, *b*, which are furnished with nuts and washers. Upon these bolts rests the weight of the head, and by them the head is screwed up or let down as occasion requires.

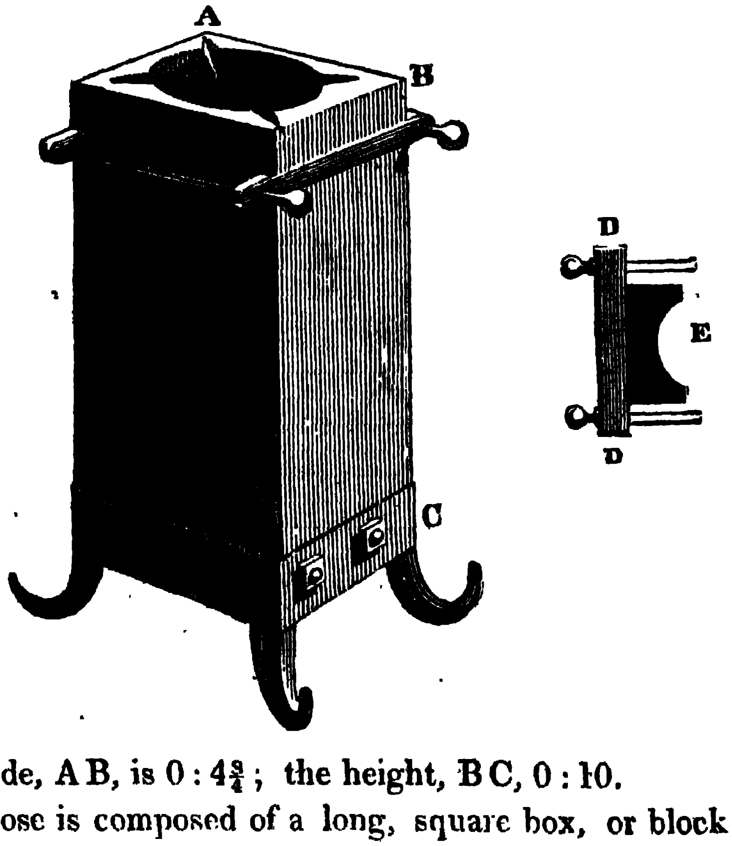
Fig. 9.—*The Till, or Shelf.*



The till is made of mahogany, or beech, 1 : 11 long, AB; 0 : 9 wide, BC; and 0 : 2 thick. It is in two parts, and has two dovetail tenons at each end, about 0 : 1½ long, 0 : 1 broad, and 0 : 1½ distant from each other: these tenons are laid in the mortises in the cheeks.

In the middle of the till, a square hole of 0 : 4¾ is made, lined with brass plate about $\frac{1}{16}$ in. thick, through which the hose passes. This square should be made to fit the hose with much nicety.

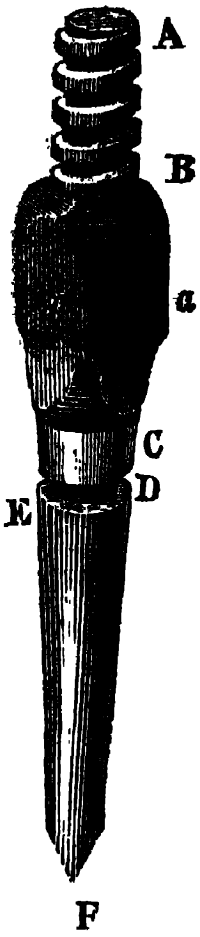
Fig. 10.—*The Hose, Garter, and Hose Hooks.*



The side, AB, is 0 : 4¾; the height, BC, 0 : 10.

The hose is composed of a long, square box, or block of wood, through which is turned a hollow cone, fitting the conical or tapering part of the spindle. The spindle is held firmly in this cavity of the hose, by the following arrangement: to the inner face of the piece DD, and the corresponding pieces on the other side of the hose, are fixed curved pieces, as shewn at E, in the small figure. This is called the half-moon garter, and is used to hold the spindle by the groove E [see figure of spindle], by tightening the screws shewn in the figure of the hose. The hose is cased with brass, or thin sheet iron, on every side, from the piece DD, downwards; and the hooks shewn at C, in the figure, are fixed to the lower end by nuts and screws.

Fig. 11.—*The Spindle.*

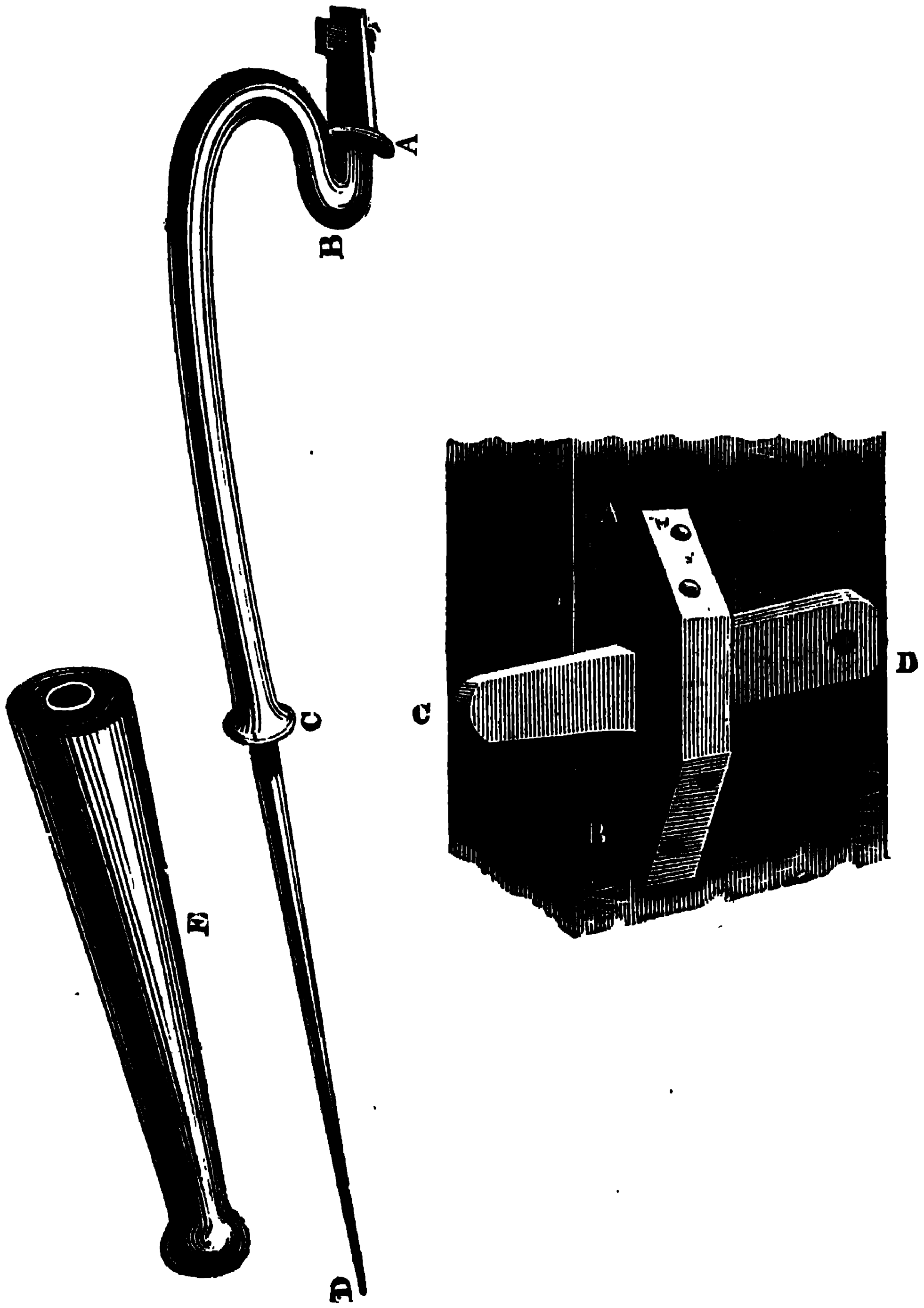


Length of the worm, A B, 0 : 5; B to C, 0 : 3½; distance across, *a a*, 0 : 3; C D, 0 : 1¼; E to the toe F, 0 : 11.

The worm of the spindle should be made with such declivity, that it may come down at an assigned progress of the bar. In a whole revolution of the spindle in the nut, the toe ought to come down 0 : 2½; but it seldom, at work, makes more than one quarter of a revolution, at one pull; in which sweep it comes down but ⅝ of an inch.

The length of the worm is 0 : 5, and its circumference, 0 : 7¼. The whole length of the spindle is 1 : 9. The bottom of the spindle is called the toe, which is about a ¼ in. in diameter, made of well-tempered steel, that by long or careless use the point of pressure wear not on one side but remain in the axis of the spindle.

Fig. 12.—*Bar, Handle, and Catch.*



A B, 0:4; B C, 1:5; C D, 1:4; E (the handle) the same length.

The bar is made of wrought iron, of about 3:0 long, and its greatest thickness, in circumference, 0:5, except the shoulder.

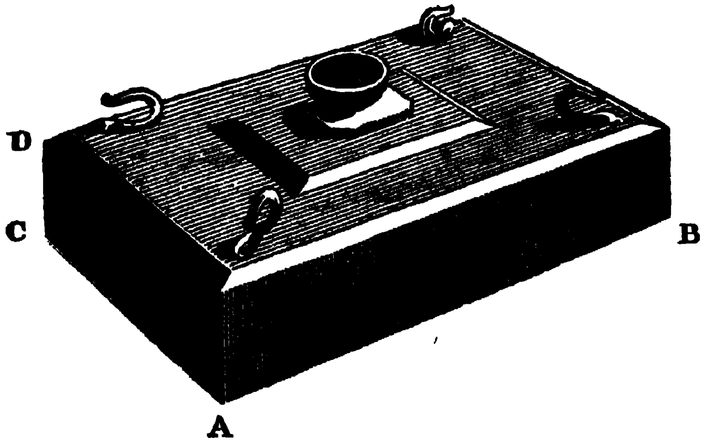
The square pin, about 0 : 1½ thick, and 0 : 3 long, from the shoulder, enters the eye of the spindle, which it should be made to fit with a great degree of nicety. At the end of this pin an eye is made, through which an iron key is put to fasten it perfectly tight to the spindle.

The wooden handle is 1 : 8 long, and, in the thickest part, 0 : 10 in circumference. A taper hole is made through the handle, into which the small part of the bar enters, and is fastened by a screw at the end of the handle.

About 0 : 4 from the shoulder it is bent, agreeable to the above sketch, which lies ready to the pressman's hand, that he may catch at it to draw the handle of the bar within his reach.

The catch for the bar is made of two pieces of beech, in the form of a cross. The short piece A B, is 0 : 8½ long, and 0 : 2 wide, bevelled at each end, and in the centre of the side which is screwed against the cheek, a piece is cut out, about 0 : 2 long and ½ in. deep, to admit the other piece C D, of 0 : 10 long, tapered off to the end on which the bar rests. This cross is screwed against the cheek, and fixed in such a position, as to retain the bar on its rebounding from the forme.

Fig. 13.—*The Platten.*

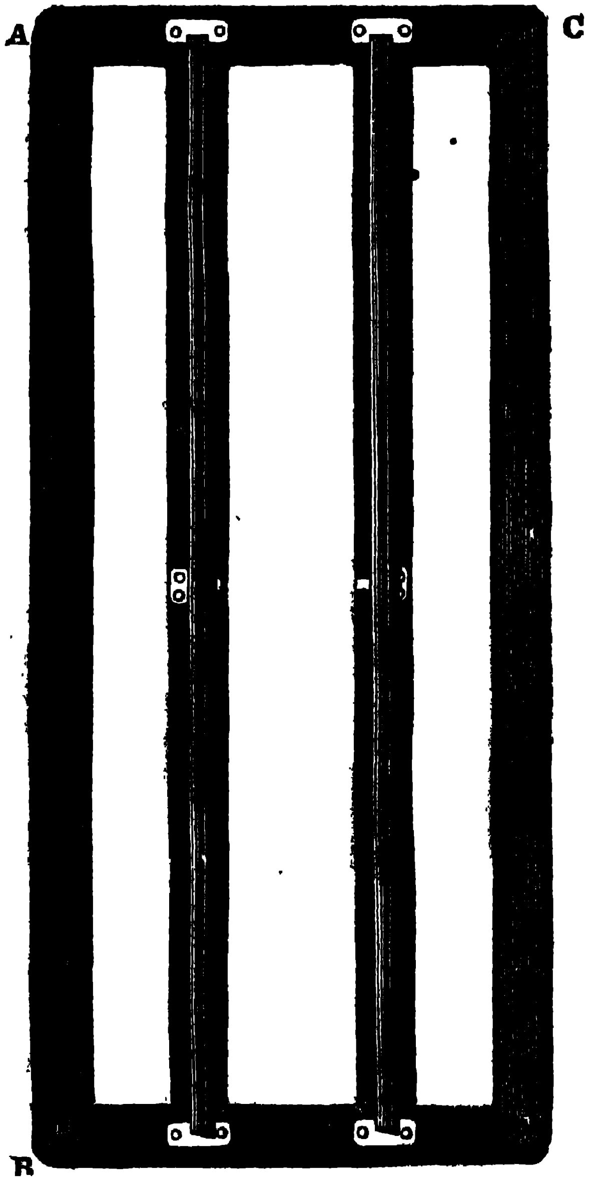


The platten is made of mahogany, 1 : 7 long, A B; 0 : 13 wide, A C, and 0 : 4 thick, C D. The face of the platten must be perfectly level and smooth. Near the four corners, on the upper side, four iron hooks are placed, with their shanks wormed and screwed, and leaning towards the platten plate.

In the centre of the platten the iron platten-plate is let in ¼ in. deep. This plate is 0 : 8 long, 0 : 4 broad, and ¼ in. thick. In the middle of it an iron frame, 0 : 2 square, and ½ in. high, is placed to receive the stud of the circular brass platten-pan. The stud is made to fit nicely into the iron frame, which keeps the pan firm and steady, and may be taken out with ease if required.

In the middle of the bottom of the pan is a small steel centre hole in which the toe of the spindle works.

Fig. 14.—*The Carriage and Ribs.*

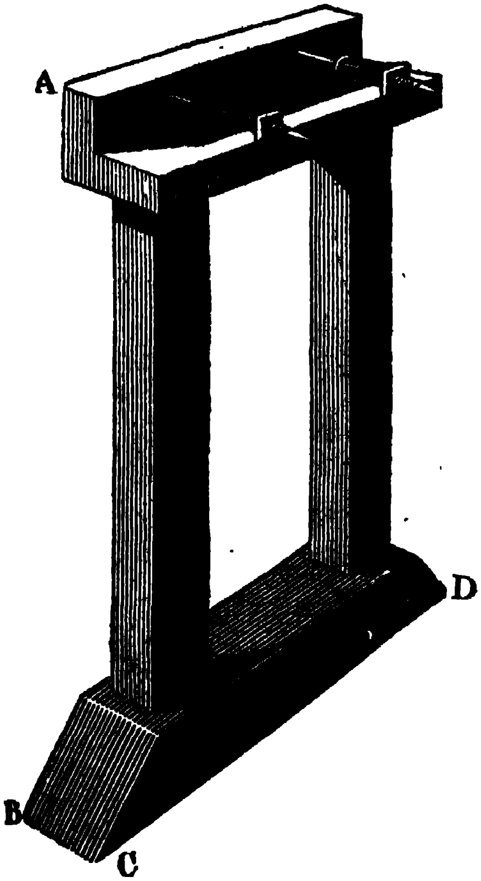


The carriage, A B, is a frame of 5 : 0 long, and 2 : 2 broad, A C, on which the ribs are placed. The two end-rails are each 0 : 4 thick, and the side-rails, 0 : 2½ thick.

Between the two side-rails, are framed into the end-rails, two wooden ribs, 0 : 2½ broad, and 0 : 1½ thick. They are placed at an equal distance from each side-rail, and the same distance between each other. Upon these the steel ribs are fastened. These ribs are made about 4 : 8 long, and 0 : 1 thick. The uppermost sides, on which the cramps rest, are of a convex form, the others perfectly flat. The two ends are flattened to about a ½ in. thick, and holes drilled for the purpose of fastening them to the end-rails. In the middle of the outer end of each rib, a small piece of iron, about a ¼ in. thick, with holes drilled in it, projects, which is also nailed to the wooden ribs. The inner side of each rib is polished, to admit the shoulder of the two first and two last cramps. This is a late improvement on the common press. It prevents the shaking of the coffin, and the slur on the work which consequently followed.

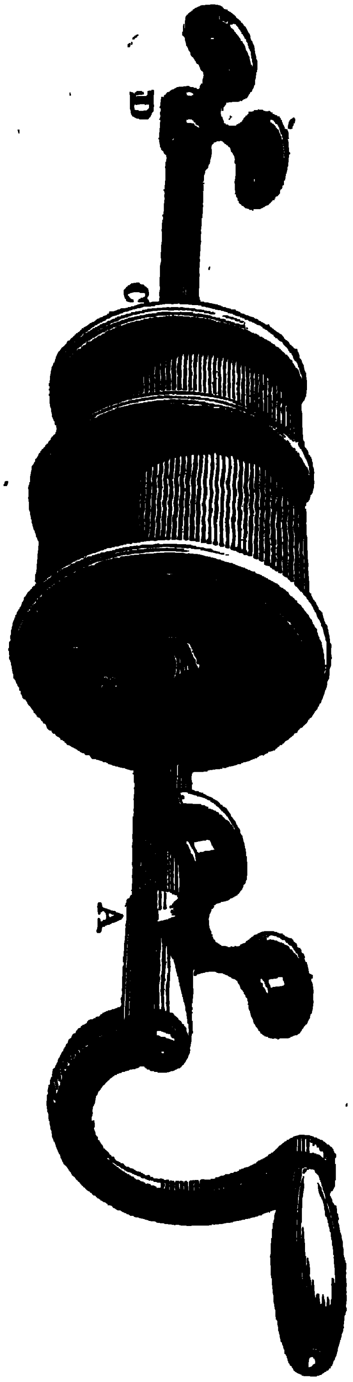
The ribs must be of an equal height and thickness, and lie exactly horizontal, in straight lines; for the smallest irregularity in this respect will affect the cramps, so as to render some of them useless.

Fig. 15.—*The Fore-stay.*



The fore-stay is made of four pieces of wood, mortised together for the purpose of supporting the end of the carriage, to which it is screwed by means of two-inch screws, of about 0 : 5 long, with nuts. Height, A B, 2 : 5 ; width, C D, 1 : 8.

Fig. 16.—*Spit and Wheel.*



The axis, or spit, is a straight bar of iron, about ¾ in. square, and is about 0 : 3 longer than the whole breadth of the carriage. The further end of it is filed to a round pin, ¾ in. long, and ¾ in. in diameter; the near end is filed away to another round pin, which is 0 : 2¼ long. At 0 : 1¼ from this end is filed a square pin, ¾ in. long; and within ½ in. of the end is another round pin, with a screw and nut on it.

On the square pin is fitted a winch, on which is placed the rounce, five inches long.

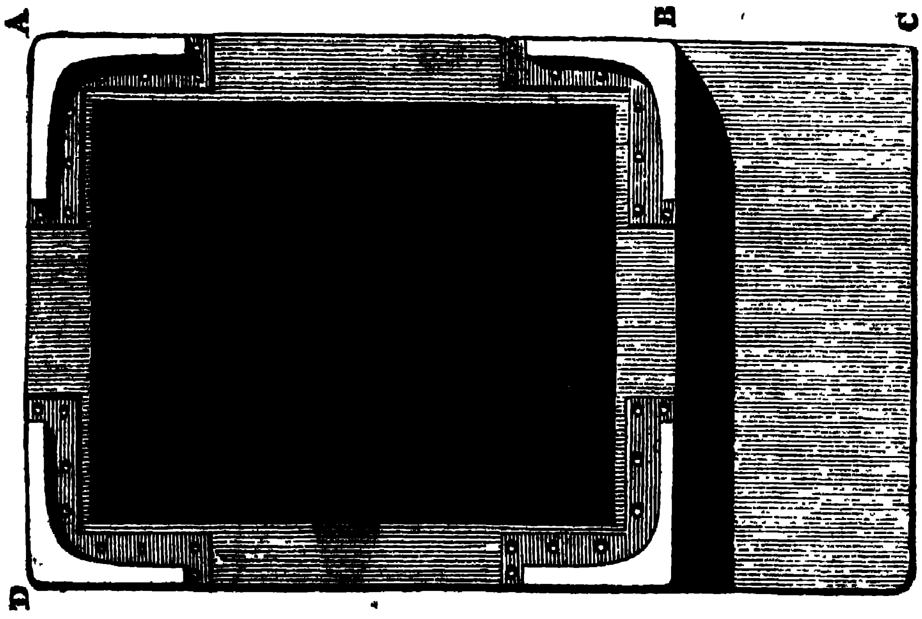
The round ends of the spit are hung upon two iron sockets, fastened with screws on the outside of the two outer rails of the carriage.

The wheel, or girth barrel, is made of beech, of such a length that it may play easily between the ribs; and of such diameter, that in one revolution a length of girth may wind about equal to half the length contained between the fore-end iron of the inner tympan, and the inside of the rail of the inner tympan. Usual dimensions, AB, 1 : 0; length of the wheel, or barrel, BC, 1 : 2; diameter of the same, 0 : 5; CD, 0 : 11; length of the handle, 0 : 5.

Fig. 17.—*The Coffin, Plank, and Cramps.*

Front View.

Off Side.



Near Side.

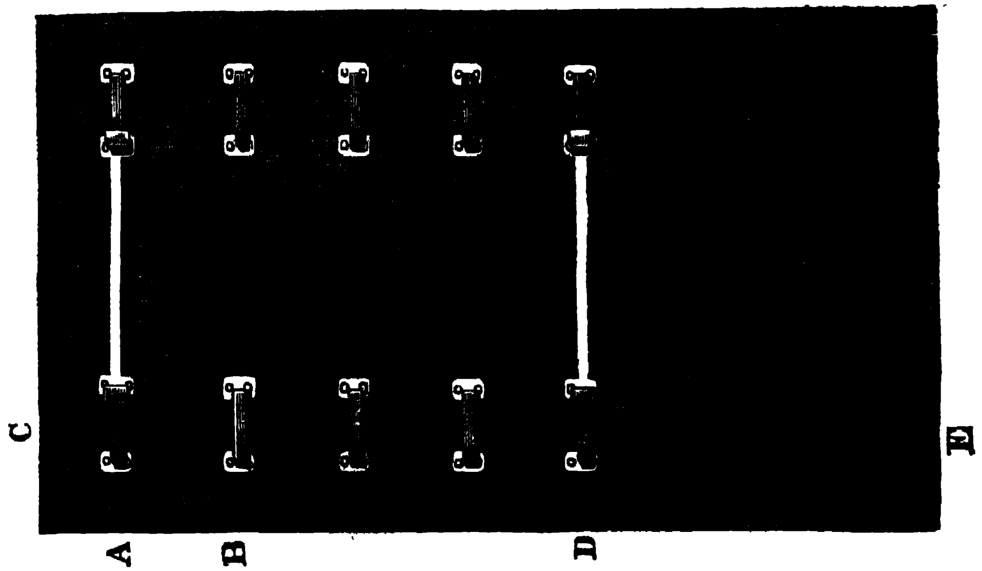


Fig. 18.—*Back View.*

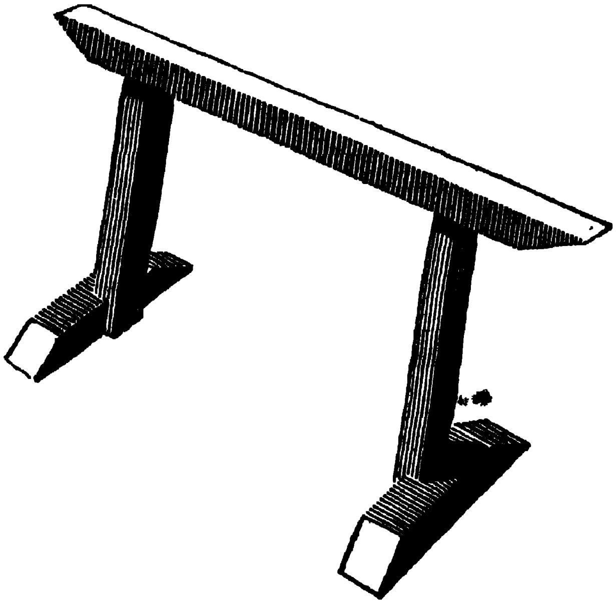
The plank of the coffin, A C, is now invariably made of mahogany, 3 : 6 long, 2 : 0 wide, and 0 : 1¼ thick, on which is fastened the cramps and the coffin. The coffin is a square frame, AB front view, 2 : 7 long, 2 : 0 wide, and 0 : 3 deep; in this the stone is bedded.

Upon each of the four corners of the coffin an iron plate, called a corner-iron, is let in and screwed perfectly level with the wood work, with return-sides about 0 : 6 long each side, ⅛ in. thick, and 0 : 2¼ broad. Upon the upper outer sides of each of these plates another strong iron is fastened with two or three rivets through each side. This iron is ½ in. deep; the outer angles only are square, but the inner angles are obtuse, being sloped away from the inner angle, towards the farther end of each inner side, for the purpose of securing the chase with quoins.

At the hinder end of the frame of the coffin, two iron joints are fastened, by means of an iron plate, screw and nut, to receive the tympans, which have also two half-joints to match. These keep the tympans perfectly steady, without which it would be impossible to keep in register.

The back view shows the manner in which the cramps are fixed. The dimensions as in the last figure; the distance of the cramps, AB, 0 : 5; AC, 0 : 3; DE, 1 : 3.

Fig. 19.—*The Gallows and Sockets.*



On the hind part of the plank, at 0 : 3 distant from each side, are nailed the sockets to receive the gallows, on which the tympans rest. The width of the gallows is 2 : 0, its height 0 : 9. The sockets are 0 : 7 long, 0 : 2½ wide, and 0 : 2½ deep. The socket holes are cut slanting, on which the gallows reclines. The sockets are screwed or nailed down on the plank, and may be easily moved backward or forward, to raise or lower the tympan, agreeable to the wish of the pressman.

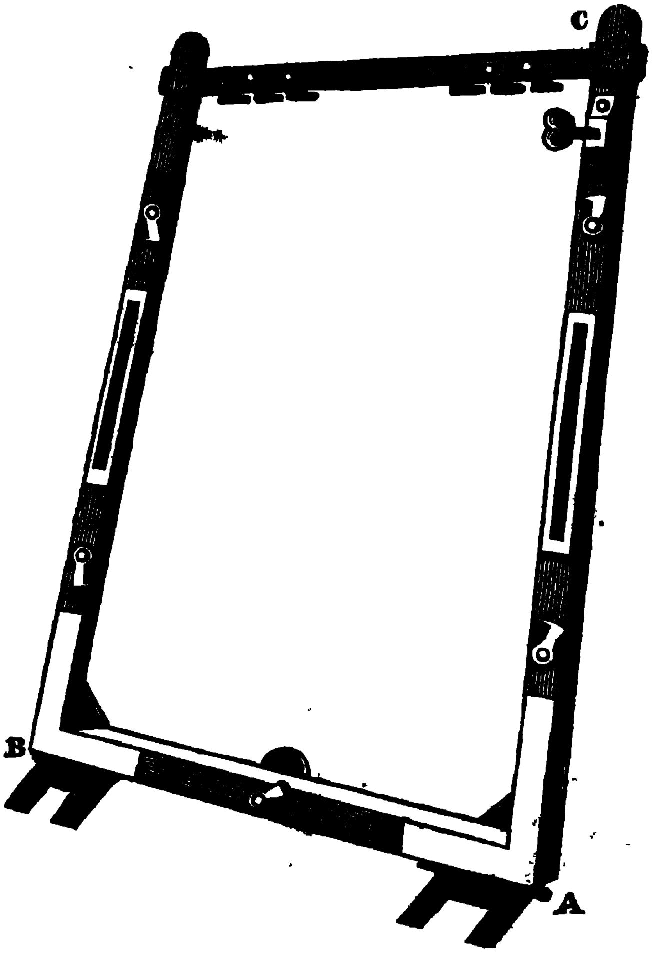
In the space on the plank, between the sockets, one of the girths is fastened on with a thumb screw, which answers the purpose much better than nails, as they injure, and frequently split the plank.

The Press Stone.

Marble stones are the best; and could the bedding of them in the coffin be always depended upon, they would turn out to be the cheapest. Purbeck, being much cheaper than marble, is now generally used.

The stone should be of an equal thickness, about ¼ in. less than the depth of the inside of the coffin, as the bedding will raise it the necessary height above the surface of the coffin. Its length and breadth must be ¼ in. less than the length and breadth of the inside of the coffin, to admit of justifiers between the stone and coffin, which are put to keep the stone steady after it is bedded. The face should be perfectly smooth and level.

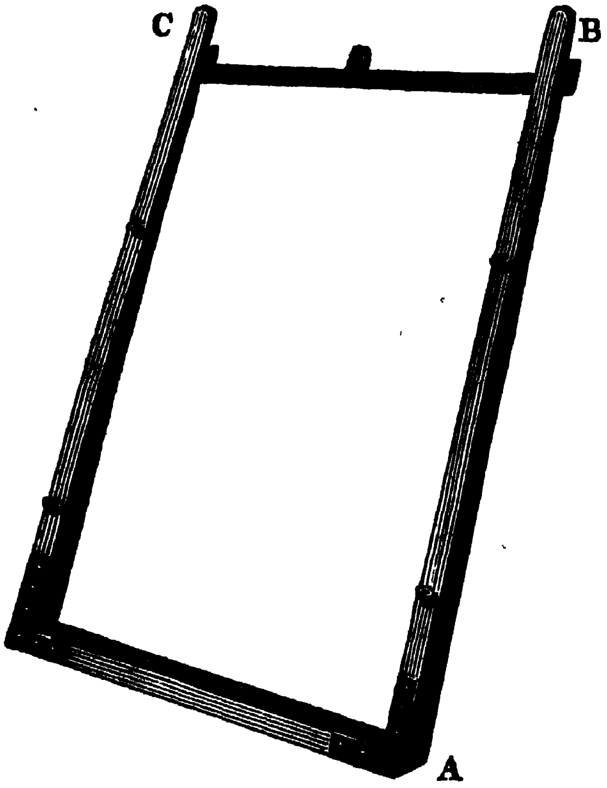
Fig. 20.—*The Outer Tympan.*



The outer tympan is a square frame, both sides and one end of which are made of beech, and the other end of iron. It is 2 : 0 wide, AB, and 2 : 7 long, AC. The breadth of the end, which is fastened to the coffin by an iron match-joint pinned on to another half joint, 0 : 1¼ wide, and 0 : 1 deep; the two sides run taper from this to the iron end, which is about the thickness of a window casement, and ½ in. wide. Upon the outer edge of this iron, about 0 : 1½ from the end of it, are made two iron half joints, to contain a pin, about ¾ in. in circumference, which, entering this half joint and the match-joint in the frisket, fastens it securely, and enables it to work easily on the tympan.

In the middle of each side of the tympan, a mortise is made through, ½ in. wide, and 0 : 6 long, to receive the square shanks of the point screws, and to allow them to slide easily backward and forward.

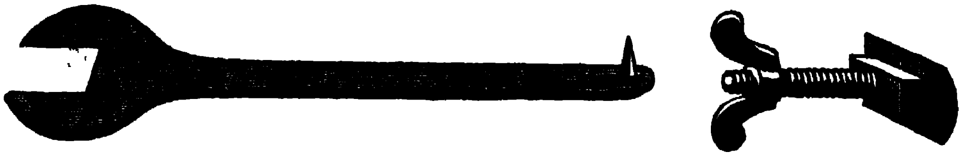
Fig. 21.—*The Inner Tympan.*



The inner tympan is also a square frame, 1 : 10 wide, CB, and 2 : 6½ long, AB, the sides and one end of which are also made of wood, and the other end of iron. It is made so much shorter than the outer tympan, that the outer edge of the iron of the inner tympan may be within the inner edge of the iron of the outer tympan; and it is made so much narrower than the inside of the outer tympan, that a convenient space may be allowed to paste a vellum between the inside of the outer tympan and the outside of the inner tympan.

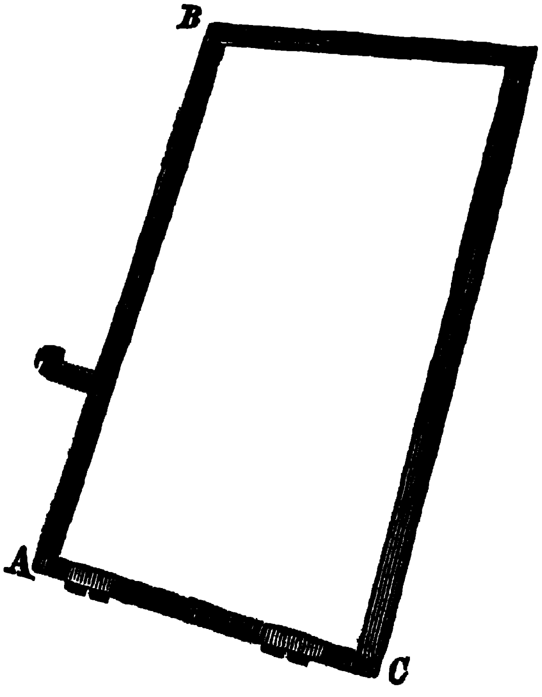
The two tympans are fastened together by hooks fixed on the outer tympan, and eyes on the inner.

Fig. 22.—*Points and Point-screws.*



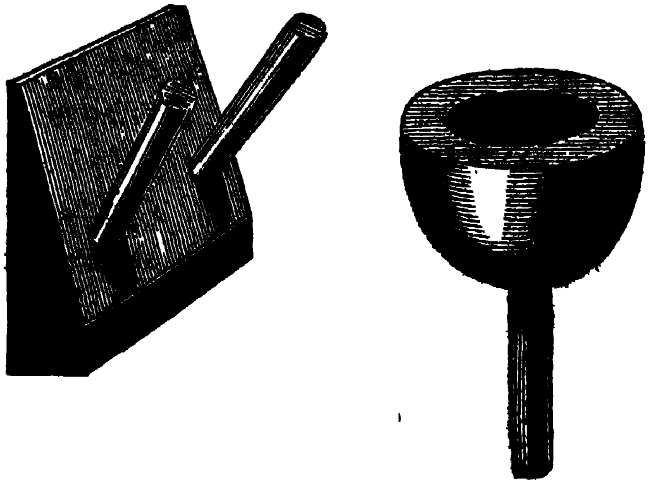
Points are made of sheet iron of different lengths, about $\frac{1}{16}$ in. thick, and in shape as shewn in the above cut. The spur of the point is riveted at the small end, and projects about $\frac{5}{8}$ in; the top of it is filed away to a fine point. The large end of the point fits into the square shank of the point screws. These screws are made of iron, with a thin head, about an inch square, and a square shank just under the head, an inch deep and half an inch square. Under this shank a screw is made, with a nut and washer, which, when put through the outer tympan, draws the head of the shank close down to the tympan, and by that means secures the point in its proper place on the outer tympan.

Fig. 23.—*The Frisket.*



The frisket is a thin iron frame, made of different sizes, with match-joints at one end, through which an iron pin is placed. About the middle of the near side of the frisket a small piece of iron projects, called a thumb-piece. The usual length is, AB, 2 : 2½ ; width, AC, 1 : 9.

Fig. 24.—*The Ball-Stocks and Ball-Racks.*

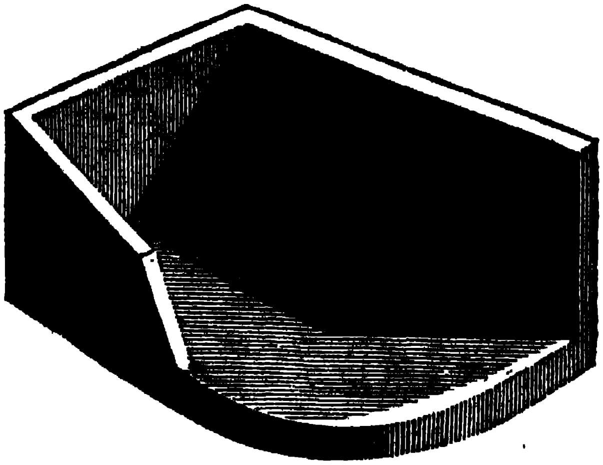


The ball-stocks are made of dry, well-seasoned elm, and turned hollow, of a conical form ; their greatest diameter 0 : 5¼, and their length 0 : 4. The handle of the stock is made of beech, 0 : 4½ long, and 0 : 1 in diameter.

The racks are also made of elm and beech, the sockets of which are elm, and the pins beech. The sockets of the first rack, which is nailed on the near cheek, 2 : 9½ from the bottom, is 0 : 9 wide, and 0 : 4½ long ; that end of it which receives the pins is 0 : 1½ thick, the opposite end only ½ in. thick. The pins are 0 : 9 long, and distant from each other 0 : 3.

Another rack, double the width, and containing four pins, is also fastened to the near cheek, 0 : 8 from the top.

Fig. 25.—*The Ink Block.*

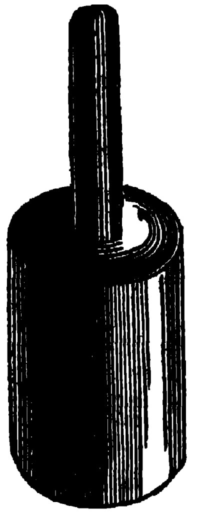


The ink block is made of beech, the bottom of it 0 : 2, and the sides $\frac{3}{4}$ in. thick; its length 1 : 1, the depth 0 : 4, and width 0 : 9.

This block is fastened to the near upper rail and hind post; and the left hand outer corner of it is cut away.

A few years since a great improvement was effected by having the ink-block made of cast iron, for the following reason: it had been found necessary for the purpose of enabling the men to work the fine and stiff inks in cold weather, to have in each press-room what was denominated a moveable ink-stand; this was a small square table, with an iron plate for the top, under which was a shelf to contain a lamp to warm the ink, and render it free to work; this was, of course, moved to the side of each press as wanted, but often proved a cumbrous article in a crowded room, when not wanted. The iron ink-block, as a complete substitute for the wooden one screwed to the cheek of the press, with a little shelf underneath it, answered every purpose of the above-described apparatus; with this additional advantage, it kept the ink cooler in hot weather.

Fig. 26.—*The Brayer and Slice.*



The brayer is also made of beech, and turned round on its sides, and flat on the bottom; its length, including the handle, is about 0 : 7, and the bottom part about 0 : 2½ in diameter.

The slice is a small iron shovel, the broadest part about 0 : 4, and about ⅛ in. thick. Its length, including the handle, is about 0 : 8.

Bank and Horse.

The bank is a deal table, 3 : 4 long, 1 : 10 wide, and 3 : 0 high. About 0 : 5 from the bottom, a board is placed within 0 : 2 of the length and breadth of the bank, and fastened to the legs, which serves as a convenient shelf for pressmen to lay their worked-off heaps.

The horse is also made of deal, 2 : 2 long, and 1 : 8 wide, forming an angle of about forty-five degrees, 0 : 6 of the highest end of it rising nearly to a perpendicular. This horse receives the wet paper, and is placed on the bank near to the tympans.

PRACTICAL DIRECTIONS TO PRESSMEN, APPLICABLE TO THE PRESSES LAST DESCRIBED.

CAREFUL, ingenious, and sober pressmen stand high in the estimation of every master-printer; and it is to be lamented that so few endeavour to merit that eminence. I shall now lay down a few directions, which, if properly attended to, will enable the pressman to do credit to himself, and justice to his employer, and preserve that superiority which now so eminently distinguishes the British press.

§ 1. *Of putting up a Press.*—This is properly the work of a printer's joiner; but a printer should know how to direct even a strange joiner to set up and fasten a press ready for its working.

This knowledge every pressman should be anxious to obtain, as he will then be able to detect and remedy those defects which the common press is so liable to from untoward accidents; I therefore recommend particularly to his attention the foregoing description of the parts of the common press, which will give him a thorough knowledge of its principles and operation.

The joiner having set together the frame, viz. the cheeks, feet, cap, head, till, winter, hind-posts, ribs, carriage, &c. the pressman directs and sees him perform as follows:

Before the head is put into its place, the pressman rubs the whole tenoned ends and tenons with soap or grease, and also the mortises which the head slides in, and so much of the cheeks as the ends of the head work against, that it may the easier work up and down.

The feet must be placed upon an horizontal level floor, and the cheeks perpendicularly upright, the stays or braces must be placed so that the press may be kept in the most steady and stable position, in order to give a check to the force of the hardest pull and most violent blow the bar may give by rebounding against the further cheek, if by chance it slip out of the pressman's hand. This consideration may direct him to place one brace against the end of the cap that hangs over the near cheek, and in a range parallel with the fore and hind side of the cap: for the more a brace stands aslope to the two parallel sides, the less it resists a force offered to the end of them, viz. the near end of the cap, which is one main stay to the whole press. If he places another brace against the hinder corner of the further end of the cap, it will resist the spring of the bar, when it may slip out of the pressman's hand; and placing two other braces, one against the near corner of the hind side of the cap, and the other against the further corner of the fore side of the cap, the press will be sufficiently braced up, if the room will afford convenience to place the further end of the braces against it.

By convenience is meant a firm solidity to place the end of the braces against, be it either a stone wall, brick wall, or some principal post, or a girder, &c. that will not start or tremble at the force of a pull. The braces ought to be straight, and of substance strong enough proportionable to their length; and, if possible, to be fixed in such a position that they may stand in the same straight line with the upper surface of the cap, viz. that the further end of the brace neither fall lower nor rise higher than the upper side of the cap. Neither ought the brace, though thus placed, to stand aslope or askew, that is, make unequal angles with the side of the cap it is fastened to, but stand square, and make right angles with the respective sides of the cap; because in those positions the braces best resist the force of continued pulls.

But though this be the strongest, firmest, and most concise method for bracing up a press, yet the room the press is to stand in will not always admit of conveniences to place the braces thus; the pressman should, however, avail himself of these rules as far as he may be able.

The press being thus fastened, the carriage is laid on; and if the joiner perform his part well in making the wood work, it will first lie exactly horizontal; if not, it must be altered where it is amiss, before the pressman lay the stone, and the stay of the carriage be fitted under the end of the ribs.

§ 2. *Laying or bedding the Stone.*—The carriage being laid on the winter exactly flat and horizontal, and the coffin placed on the ribs, the pressman then lays the stone. Some bed the stone with bran, others with plaster of Paris; but, from long experience, I have no hesitation in saying that brown paper answers the purpose much better; and such a quantity of it should be laid in the coffin as will raise the stone a double pica above the surface of the coffin, which will be reduced by the first pull to a pica, and in a short time will leave the projection about a brevier, which it ought always to preserve.

When a stone is laid on brown paper, bran, or plaster of Paris, the pressmen sling the stone in two strong cords; then bring it as nearly as they can into an horizontal position, and with great care and caution let it down in such a manner into the coffin as that the whole bottom of the stone touch the bedding at once; lest by an uneven lowering of the stone the bedding be disturbed. Having laid the stone down, they drop a small quantity of water about the middle of the face of it, to try whether it lie truly horizontal, which they ascertain by the standing of the water; if it have an inclination to one side more than another, the declivity is on that side, and the stone must be re-laid.

§ 3. *Setting the Rounce.*—This, when properly done, saves labour and facilitates the work. The girths should be nailed on the barrel of the rounce; when the press is run out, the near girth will be half a turn round the barrel; the off girth will be about three turns round it. Every press should have screws for the purpose of fastening the girths, one fixed on the coffin-plank behind, and another at the head of the coffin; these are screwed and unscrewed with ease, which enables the pressman to fix the rounce in its proper position with very little trouble. Nailing the girths on the plank and coffin injures both, and they frequently give way, occasioning much trouble and loss of time. The rounce should be set in such a position, that the fore-end of the tympan will just lie down and rise free, without touching the fore-edge of the platten.

§ 4. *Hanging the Platten.*—A heavy forme is laid on the press, with two broad-cloth blankets and two sheets of paper on it; or, which will answer the same purpose, a quire of demy paper: it is then run in, and the platten placed on the head of the coffin, hanging down, in order to let the point of the spindle clear the top of the pan, to allow it to fall into the plug destined to receive it. The platten should lay on the forme, in the centre of the press, parallel with the foresides of the cheeks, which should be adjusted with a great degree of nicety. The pressman then pulls the spindle hard down upon the platten, and sets the edges of a paper-board between the bar and the further cheek of the press, to keep the bar from starting back, or secures it by fastening it well with a rope to the near cheek.

Having provided cord, he makes a noose at one end, and puts it over one of the hooks of the platten, lashing the cord also upon the hose-hook, immediately opposite, and again upon the platten-hook with as much force as possible, and so on till there remain about two feet of the cord; then he begins to wind round these lashings, to draw them close together, and fastens them with two or three hard knots. In the same manner, and at the same time, another person should tie up the opposite diagonal corner of the platten, using equal strength in order to prevent any corner from rising up or hanging down.

§ 5. *Justifying the Head.*—Justifying or scaleboarding the head is, to put into the mortises in the cheeks between the upper sides of the tenons of the head, and the upper sides of the mortises in the cheeks, an equal quantity as to thickness of scaleboards, that when the pressman pulls, the tenons of the head shall have an equal horizontal level cheek.

In justifying the head, the pull is to be made long or short, which is done by putting in or taking out the scaleboard. A heavy forme will require the whole strength of the pressman in order to bring off a clear and perfect impression. The height of the bar is generally made to lie at the command of a reasonably tall or short man.

A long or a soaking pull is when the forme feels the force of the spindle by degrees, till the bar comes almost to the near cheek of the press; and this is also called a soft pull, because it comes down in a soft, soaking, and easy manner; and, on the contrary, the short pull is called a hard pull, because it is suddenly performed.

The pull should be gradual and elastic, which is accomplished by always bringing the bar of a new press, for the first three months, down to the near cheek; and no press can be considered as properly worked down, unless this plan be followed. During the time the press is working down, the head and winter will require an additional scaleboard now and then, which addition will be regulated by observing whether the pull produces an adequate impression. The head should never be screwed up tighter than can be accomplished with the finger and thumb, in order to preserve in the scaleboard a proper elasticity.

When the pressman justifies the head, he unscrews the nuts of the head-screws, or long bolts, that the weight of the head may draw it down, to make room for the justifiers of the mortises in the cheeks; and when he has put in as many as he thinks necessary, he screws up the head again. He then lays down the tympan on the forme, and runs in the carriage under the platten, and pulls upon it, while his companion screws up the head, as before observed, with his finger and thumb.

The ribs, the tympan-joints, the frisket-joints, the garters, both ends of the rounce-spindle, the nut and spindle, and the toe of the spindle, are all to be well oiled, that they may perform their several offices the easier and lighter, both over and under hand.

§ 6. *Covering the Tympans.*—The tympans are covered with vellum, forrels, or parchment. The skins should be of an equal thickness, and about 0 : 2½ wider, and 0 : 3 longer than the tympans.

Tympans have been sometimes covered with muslin, which, on account of its evenness, would answer the purpose; but it is so apt to stretch that the tympans become slack in a short time, and bag (as it is termed), which occasions a slur on the work.

Having provided some stiff paste, the pressman lays so much of it on the edges of the skin as will cover the tympan, which is also well pasted. He then lays the skin on the tympan, and draws it, regularly, as tight as possible, on all sides. That part of the skin that comes on the grooves of the tympan which receive the point-screws, is cut and wrapt round the inside edge of the groove, which admit a free passage for the screws. After having fastened the skin on the sides of the tympan, he draws it towards the joints which receive the frisket, and with a knife cuts across these joints to let them through the skin; he then puts the frisket pins through the same, and makes that end of the tympan fast. He next proceeds to the lower joints, and brings the skin as tight as he can round that part of the tympan. The point-screws and duck's-bill are then put on, which prevent the skin from starting.

The inner tympan is covered in the same manner, and in order to prevent its warping, a stick or a piece of furniture is placed in the centre of it, till it be perfectly dry.

The skins are put on either wet or dry; if dry, they should be afterwards well wetted, which makes them give for the moment; they are then drawn as tight as possible. As they dry, they contract, and are by this means rendered much tighter than they would be if put on wet.

§ 7. *The Blankets.*—The next matter of importance towards obtaining good press-work is, the substance which is fixed in the tympans to intervene between the type and the platten, in order, when the power is applied, to cause an impression into the substance of the paper. Whatever is used for this purpose it is now become technically correct to denominate The Blankets. For this purpose there has been generally used a kind of blanket, manufactured for the purpose, of a more even fibre than ordinary blanketing, free from knots, and having a very fine surface, or pile: and to vary the impression as different kinds of work might require, very thin, or Welsh flannel, kerseymeres, or fine broad-cloth were used. These are varied by the judgment of the master or pressman, according to the type, paper, ink, &c. with which he works: thus for very close or heavy formes, small type, he must select the softest woollen blanket; for larger type and lighter work he must select the finer flannel, or cloth blanket, and for yet larger type and more open work, he must continue the change to a single kerseymere. Again, a discretion will be required, according to the state or wear of the type—the newer the letter and sharper the ceriphs, the finer may be the work, the stronger the ink, and the harder the impression; while, on the contrary, in order to make type which has been worn appear *well up to paper*, additional softness must be given. The kind of press, also, at which the work is to be done requires to be treated with a due degree of discrimination. A joiner's press, with wood platten, usually requires a soft or soaking pull, and the blankets must be increased accordingly: a Stanhope, or other iron press, will work best with as little in the tympans as possible. In fact, nothing but observation, experience, and good mechanical common sense can guide the judgment of the pressman in this most material point of *making ready*. By the various changes and combinations of his blankets, adding a soft to a hard, or a hard to a soft one; reversing them in regard to the one or the other falling next the type; adding a sheet of paper, or glazed paper, between, or under, or over, he must, with necessary judgment and patience, regulate his pull according to the various combinations of circumstances which may attend his work.

The introduction of a power-wove cloth, or blanketing, of peculiarly fine, close, and even texture, wove by the power of machinery, by William Whitehead, and Co., of Oakview Mills, Saddleworth, near Manchester, has furnished a material of great advantage to press-work, both letter-press and copper-plate.

The texture of this fabric is of the most even nature that perhaps can possibly be acquired; the great power of the machinery laying the warp and weft in a far superior manner to any thing within the power of the human hand alone. The weft is formed of pickings of the wool best adapted to give a peculiarly soft yet elastic pressure, so as to bring off the most equal impression from the face of the type, or lines of the engraving. To suit every possible purpose it is made of various degrees of fineness. I think about four varieties a necessary assortment. These I number in progression; thus

No. 1,	the finest that can be required, cut to suit a demy and royal forme, weighs about	3 oz.
2		5¼
3		6
4		7

This arrangement serves with sufficient precision for every description of press-work; and, although costing something more than the common blanketing and flannel, is yet much within the price of broad-cloth and kerseymere. The width is twenty-seven inches, and price 6*s*. 6*d*. to 8*s*. per yard. It is now supplied by the agency of Messrs. Smiths and Son, 237, Southwark. What I have designated as my No. 1, is their No. 8, 2 is their 5, 3 is their 3, and 4 is their 4.

§ 8. *Making ready a Forme.**—A careful pressman will take care, before he lays a forme on the press, to wipe the press-stone perfectly clean; for if any (however small) hard particle be on it, the letter that lies on that matter will, with pulling, quickly rise, and not only make a stronger impression than the rest of the forme, but in all probability cause a dent in the platten, and bear off the adjacent letters. He will also carefully examine whether the back-side of the forme be clean, before he attend to the register, or otherwise make ready his forme. The forme should be laid under the centre of the platten.

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* Much of this section equally applies to any kind or construction of press—I must leave to the reader the discrimination of what exclusively relates to either one press or the other.

He next lays the tympans down upon the forme, and places the blankets; then putting in the inner tympan, he fastens it with the hooks and button for that purpose, which serve to keep it from springing upwards. He afterwards folds a sheet of the paper he is about to work, in quarto, and lays the short crease over the middle of the grooves of the short cross, if it lie in the middle of the forme; for in twelves it does not, and then he folds the paper accordingly, the long crease of it upon the middle of the long cross. Having wetted his tympan, which is done in different degrees for close, heavy works, but little or none for very light, open works, he turns it down upon the paper, and running in the carriage, pulls that sheet, which, with the wet tympan and the force of the pull causes it to stick; and turning up the tympan again, he examines if the sheet be laid even; if it has not been laid even on the forme, it is better to re-lay it, and pull it again; for it is of considerable importance that it should be put on perfectly even. This sheet is called the tympan-sheet, and is placed there as a standing mark to lay all the other sheets exactly even upon, while he works the white-paper.

Having laid on the tympan-sheet, he chooses his points; for large paper, short-shanked points, and for small paper, long-shanked points, and others in proportion to the intermediate sizes of paper; for his points ought to be so placed that they may prick the point-holes within the grasp of the hollow between his right-hand thumb and fore-finger; that, when he works the reiteration, he may the better manage and point the sheet when laying it on the tympan.

Nor will he place his points too near the edge of the paper; because, in working the reiteration, he would be forced to carry his furthermost point-hole the further from him, which in a long number is a loss of time: the less distance, also, there is between the off and near point-hole, the more time is saved; because he must draw his body so much the further back, to place that hole on its point; he, therefore, places the near point further into the paper than the off-point, if it be folio, quarto, or octavo; but to twelves, equally distant from both edges of the paper.

By placing the points unequally from the edges of the paper, as in folios, quartos, and octavos, as aforesaid, he also secures himself the more from the danger of a turned heap when he works the reiteration; because, without very much altering the quoins, he will not be able to make register, and the accident will be at once detected; and pressmen, especially if they work upon the same sort of work, seldom or never remove the quoins on the further side of the carriage, nor on the right-hand end of the carriage, but let them lie as gauges for the next forme; for by thrusting the chase close against these quoins, the register is almost, if not quite, made; the compositor having been supposed to have chosen chases exactly of an equal size, and made equal whites between the crosses, &c.; this is one great advantage of cast-iron chases, from the same pattern.

Having chosen his points, he places them so that they may both stand in a straight line, parallel with the top and bottom sides of the tympan. He then lays the tympan down upon the forme, holding the frisket-end of it in his left hand, about an inch or an inch and a half above the face of the letter, and sinks his body downwards till he can see between the forme and tympan; and with the ball of the middle finger of his right hand presses gently upon the tympan over the point-ends of each point successively, to see if the points fall in or near the middle of the grooves in the short cross. If they fall exactly in the middle of those grooves, the forme lies exactly between the middle of both the ends; if they fall not exactly in the middle, he moves the forme between the ends of the carriage till they do, and then quoins up both ends of the chase.

Under this phrase, of *making ready the forme*, are comprehended many other operations: for, 1, The frisket must be covered with brown or stiff paper, by means of paste, and cut; to perform which the pressman fits the match-joints of the frisket into the match-joints of the tympan, and pins them in with the frisket-pins, or screws them up, if working on centres; and having beaten the forme, turns down the frisket and tympan on the forme, and pulls on the covered frisket. Then he runs out the carriage, takes up the tympan and frisket together off the forme, and lays them on the gallows; then draws the frisket-pins, or pivots, out again, and takes off the frisket, and laying it flat on his bank, with the point of a sharp knife cuts through the frisket about all the sides of each page, allowing to each he thus cuts out of the frisket about a nonpareil margin on all the sides of the cut pages; then he pins or screws his frisket again on the tympan, as before.

2. He then sees that the forme be properly locked up.

3. That no letters or spaces lie in the white lines of the forme; which may happen if the compositor have made any corrections since the forme was laid on the press.

4. If any wood-cuts be in the forme, that they be exactly letter high; if not, for it seldom happens that they are, he must make them so. If they are too low, he underlays them; but examines first how much they are too low, by laying one or more cards or scaleboards upon the face of the woodcut, and, by means of a straight edge, or feeling with the fingers of his right hand if the intended underlay be exactly even with the face of the letter. If it be not, he tries thicker or thinner underlays till he has made it on a level.

Having evened his underlay, he unlocks the quarter it is in, takes the wood-cut out of the forme, and fitting a scaleboard, or card, or what he judges requisite, to the bottom of it, places it thus raised in the forme. Not trusting to his judgment altogether for the thickness of the underlay, he locks up the forme again, pulls a waste sheet upon it to sink it as low as it will go, and then observes if it be a proper height; thus adding or taking away till it produces a clear and perfect impression. If the wood-cut be too high, it must be planed lower at the bottom; or he may introduce a few sheets of paper in the tympans, and cut away the part that bears on the wood-cut, until he gets it even.

5. If a white page or pages happen in a forme, and he use a new-made frisket, he does not cut out that page; but if he work with an old frisket, and that page is already cut out, he pastes on a piece of paper to cover the white page in the forme, that it may not black. Those pages adjacent to a white page will come off harder than any other in the forme; to prevent which, the pressman fits a bearer on the frisket. Bearers are generally made of great-primer or double-pica reglets, which, when laid on the forme,

will be about a thin lead higher than the letter. They are cut about an inch long, and then pasted, and laid on the furniture of the forme with the pasted side upwards; the frisket and tympan are then laid down upon the forme, and an impression made, which will cause the bearer to stick on the frisket. Cork bearers are frequently used, which, from their elasticity, in many cases are very useful, or paper bearers, by rolling up and pasting pieces of wrapper.

6. He examines whether the frisket bites; that is, whether it keep off the impression from any part of the pages; if it does, he cuts away so much, and about a nonpareil more, off the frisket where this happens.

7. He examines if the beards of the letter print at the feet of the pages; if they do, he considers whether the too short or too far running in of the carriage causes it; or whether it be only the beard of a short page that comes off; if the last be the cause, he remedies it by a bearer.

8. If the carriage be run in short, and the feet of the pages stand towards the platten, the hind-side of the platten will press strong upon the feet of those pages; and if the carriage be run in too far, the feet of the pages that stand towards the hinder rail of the tympan will most feel the force of the platten; and according to a greater or less proportion of that force, and to the softness or yielding of the paper, tympan, and blankets, and all other springs in the press, the feet of the pages and beard of the letter will more or less print hard. In this case he runs the carriage under the platten, till the further edge of the platten just covers the feet of those pages, and with a piece of chalk makes a stroke over the plank of the near side of the carriage behind, and the upper side of the rail of the ribs; then he runs in the carriage again, till the foreside of the platten just covers the feet of the pages next the hind rail of the tympan, and makes another mark with chalk on the rail of the ribs, to join with the mark he first made on the plank of the carriage. He now runs out the carriage, and lays the tympan down on the forme; then runs in the carriage again till he joins the mark or line he made first on the plank and rail of the ribs, and makes a mark with chalk on the further rail of the tympan to range with the fore-side of the platten. This mark on the tympan shows him how far he must run the carriage in

against the fore-edge of the platten, for the first pull.* Then he runs in the carriage further, till he joins the same mark, or line, on the plank, to the second mark he made on the rail of the ribs, and makes another on the further rail of the tympan to range with the fore-side of the platten, for the mark to which he is to run the carriage in against the fore-edge of the platten, for his second pull.

9. †He examines if the catch of the bar will hold it when the spindle makes a small spring, viz. when the bar flies but a little way back from the pressure of the forme; if it will not, he knocks up the catch higher, and then turns the screw on the shank, and consequently the catch close and firm against the cheek of the press. But if the catch stand too high, so that it will not without a great spring (viz. when the bar is pulled hard from the further cheek) fly up; he then knocks upon the top of it, to sink it lower; and, when it is well fitted, screws it up again as before. If the catch stand too low, it will not hold the bar, which will come down when he is at work; for if, as it often happens, he lets the bar fly back harder than ordinary, or if it slip out of his hand, it will knock hard against the cheek, and spring back again. If the catch of the bar stand but a little too high, the violence of the bar's flying back to make it stick on the catch, will soon loosen the square of the bar in the eye of the spindle, and indeed subject the whole press to an unstable condition.

10. ‡He considers whether the catch of the frisket stands either too forward or too backward. It may stand too forward, though, when it is leisurely turned up, it stays the frisket; because, when the pressman is proceeding in his work, though he generally throws the frisket quick up, with an accustomed, and, as he intends, equal strength; yet, if his guess at strength in throwing it up varies, and it comes, though but a little, harder up, the catch will make the frisket return; and though, as it sometimes happens, a solid wall serves to do the office of a stay for the frisket, yet with a little too hard throwing it up, the frisket itself will so shake and tremble from end to end, that before it recovers rest, its own reverberatory motion will cause it to fall down again.

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* This, and similar passages, the reader will at once perceive to apply only to the two-pull presses.

† This section applies wholly to the joiner's press.

‡ This section applies to every press.

If the catch stand too backward, then, after he has given the frisket a touch to bring it down, it will be too long before it will follow, and retard the progress of the work, and not unfrequently cause the sheet to slip out of its proper place; he therefore places the catch so that the frisket may stand a little beyond a perpendicular backwards, that with a near-guessed strength in the tossing it up it may just stand, and not come back; for then with a small touch behind, it will again quickly come down upon the tympan.

11. He fits the gallows so that the tympan may stand as much towards an upright as he can; because it is the sooner let down upon the forme and lifted up again. But yet he will not place it so upright as to prevent the white sheets of paper from lying secure on the tympan; and for reiteration sheets, their lying upon the points secures them.

12. He considers the situation of the foot-step, and he places it so as may best suit with his own stature; for a tall man may allow the foot-step to stand further off and lower than a short one, because his legs reach further under the carriage, and he can tread hard to add strength to his pull, when a short man must strain his legs to feel the foot-step, and consequently diminish the force of his pull.

13. Few pressmen will set the range of the paper bank to stand at right angles with the plank of the carriage; but they draw the further end of the paper bank so as that the near side may make an angle of about seventy-five degrees, more or less, with the near side of the carriage. The reason is, if the near side of the paper bank stand at right angles with the near side of the carriage, he must carry his hand further when he lays or casts the sheets, which would occasion delay: besides, his companion has a nearer access to it, to look over the heap, which he frequently ought to do, to see the colour of the work.

14. The pressman brings his heap, and sets it on the horse, on the near end of the paper bank, as near the tympan as he can, yet not to touch it, and places an end of the heap towards him. He then takes the uppermost, or outside sheet, and lays it on the bank; and taking three, or four, or five quires off his heap, he shakes them at each end, to loosen the sheets, that with pressing stick close together; and not finding them loose enough, he shakes

them long-ways and side-ways, to and fro, till he finds he has sufficiently loosened or hollowed the heap. Then with the nail of his right-hand thumb, he draws or slides forward the upper sheet, and two or three more commonly follow gradually with it, over the hither edge of the heap, to prepare those sheets ready for laying on the tympan.

§ 9. *Rubbing out Ink.**—Before the pressman goes to work, he rubs out his ink. If it has lain long on the ink-block, since it was last rubbed out, the surface of it is generally dried and hardened into a film or skin,′ for which reason he carefully takes this film quite off, before he disturbs the body of the ink; for should any, though ever so little of it, mingle with the ink, when the ball happens to take up the little particles of film, and delivers them again upon the face of the letter, they produce picks, print black, and deface the work; and if they get between the face of two or more letters, or the hollows of them, they will obliterate all they cover; and if they be pulled upon, and the pressman not careful to overlook his work, they may run through the whole heap. Having carefully skinned off the film, he brings forward a small quantity of ink near the edge of the block, which he rubs well with the brayer. Care should be observed not to bray out much at a time, for if this be done it will be impossible to preserve any degree of uniformity in taking ink.

§ 10. *Of Beating, or Rolling.*—The application of the ink is so important a part of a pressman's business, that, if not properly done, every other operation becomes almost useless. A careful beater, or roller, will never be found to take much ink at one time; but keep brayed out in the front of the ink block, or stage, a small quantity, that he may be certain of never receiving more than is necessary. The great art is, to preserve a uniformity of colour, which is easily performed by paying a proper attention to the taking of ink; this done regularly, and the form well gone over, the man may then be said to have done his duty.

All pressmen do not beat alike, but the method generally followed by good workmen is, the moment the tympans are lifted up, to lay the balls on the left-hand near corner of the forme, that he may the more readily carry them to the near right-hand corner, while his companion is casting the sheet on the bank; if this opportunity be lost, it occasions delay, and in all probability leaves that corner untouched by the ball, and makes what is technically termed *a friar*.

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* These directions must be applied according to circumstances of using balls or rollers.

In beating over the forme the elbows should be kept rather inward, and the ball-stock handle inclining outward, in order that the balls may be perfectly upright; it will also enable him to go over the corner before mentioned with greater ease and certainty. This plan, if strictly followed, is unquestionably the most expeditious, as well as the least liable to defects, if common attention be observed by the beater. He begins, as already observed, at the right-hand near corner, and goes up that side of the forme and returns, and leaves off at the left-hand near corner, taking care to make the forme feel the force of the balls, by beating hard and close. In the operation of beating, the balls should be constantly turning round in the hands, as it keeps them in their proper shape, and thereby renders them more safe and pleasant to work with.

The balls should not go too far over the forme, for they are liable to gather dust, and consequently throw picks on the forme, which are not easily got rid of. These picks, and every other defect, it is the business of the beater to look carefully after, and to endeavour to mend and prevent. His companion can also, when taking off the sheets, give a slight glance over them; but the uniformity of the work will depend principally upon the beater. He will point out to the puller any defects in laying the sheets on the tympan, or if he neglects to pull down the work with the force it requires.

Having thus gone twice upwards and downwards with the balls, beating close and strong, the forme may then be considered sufficiently beaten; but if he beat the first sheet of a fresh forme, or after a forme has been lately washed and consequently damp, or makes a proof, he goes three, four, or five times upwards and downwards, for the letter will not take the ink without several beatings.

The application of the rollers will be guided by similar principles. Having, either by turning the iron cylinder, working against the edge of the ink-trough, or by passing the brayer conveying the ink along the elevated part of the ink-table, obtained a line of ink, the workman transfers so much as he deems necessary to the roller; and then, by repeatedly working it on the table, distributes the ink perfectly equal over the whole surface. At the *moment the puller throws up the tympans, he moves the roller from off the table to the forme; and passing it from the near to* the off side, and back again, replaces it on the table, and either repeats the operation of taking ink, or pays the necessary attention, at intervals, to the work on the bank.

§ 11. *Of Pulling.*—The puller lays on sheets, lays down the frisket and tympans, runs in and out the carriage, takes up the tympans and frisket, takes off the sheet, and lays it on the heap. All these operations are comprehended in the term pulling; and as in pulling, so in beating or rolling; for though the companion brays out the ink and distributes it, takes it from the cylinder, &c. and distributes it on the rollers, peruses the heap, &c. yet these operations are included in the general terms of beating or rolling.

To take a sheet off the heap, the puller places his body almost straight before the near side of the tympan; but nimbly twists the upper part of his body a little backwards towards the heap, the better to see that he takes but one sheet off, which he loosens from the rest of the heap by drawing the back of the nail of his right thumb quickly over the bottom part of the heap (but in the reiteration, care should be observed to draw the thumb on the margin, or between the gutters, that the sheet may not smear or set off) and, receiving the near end of the sheet with his left-hand fingers and thumb, catches it with his right hand about two inches within the further edge of the sheet, near the upper corner, and about the length of his thumb below the near edge of the sheet, and brings it swiftly to the tympan, and at the same time twists his body again before the tympan, only moving his right foot a little from its first station forwards under the coffin-plank, or the table; and as the sheet is coming to the tympan (suppose it to be white-paper) he nimbly disposes the fingers of his right hand under the further edge of the sheet near the upper corner; and having the sheet thus in both his hands, lays the further side and two extreme corners of the sheet down even upon the further side and extreme further corners of the tympan sheet; but he is careful that the upper corner of the sheet be first laid even upon the upper corner of the tympan sheet, that he may the sooner disengage his right hand. If, however, by a quick glance of his eye, he perceives the sides of the sheet lie uneven on the tympan sheet, *with his left hand at the bottom corner of the sheet,* he either draws it backwards, or pulls it forwards, as the sheet may lie higher or lower on the near corners of the tympan sheet, while his right hand, being disengaged, is removed to the back of the ear of the frisket, and with it gives it a light touch to bring it down upon the tympan, laying, at the same moment the tympan on the forme. He then, with his left hand, grasps the rounce, and with a moderate strength quickly gives its winch about one turn round;* but to regulate his running-in, he first makes a mark, as before observed, on the further rail of the tympan, to which mark he runs the carriage in, till he brings the mark in a range with the fore edge of the platten; and as it is running in, skips his hand to within an inch or two of the end of the bar, and then gently leans his body back, that his arm, as he pulls the bar towards him, may keep a straight posture; because in a pull it has then the greatest strength. He now puts his right foot upon the footstep, while his left hand holds fast by the rounce; as well to rest on the footstep and rounce, as to enable him to make a stronger pull; which will prove longer or shorter according to the strength put to it. Then disengaging his right hand again from the handle of the bar, he slips it to the bow of the bar, before the handle rebounds quite back to the cheek of the press; for should the bar by its forcible spring knock hard against the cheek of the press, it might not only shake some of its parts out of order, but subject the whole machine to injury; besides, the further the bar flies back, the more he is retarded in recovering it again. But yet he must let the bar fly so far back, as that the platten may clear the tympan; lest, when he runs in for his second pull, the face of the platten rub upon the tympan, and force the sheet upon the face of the letter, which slurs or doubles the impression, and destroys the sheet.

Having made the first pull, and the rounce still in his left hand, he turns it round again, till the carriage runs in so far as that the second mark of the rail of the tympan comes in a range with the further edge of the platten, as before, and then pulls his second pull, as he did his first, and slips his right hand again off the handle of the bar to the bow, guiding the bar expeditiously to its catch; and just as he has pulled his second pull, he gives a quick and strong pressure upon the rounce, to turn it back, and run the carriage out again: as soon as he has given this pressure, he disengages his left hand from the rounce, and claps the fingers of it towards the bottom of the tympan, to assist the right hand in lifting it up, and also to be ready to catch the bottom of the sheet when the frisket rises, which he conveys quick and gently to the catch; and while it is going up, he slips the thumb of his left hand under the near lower corner of the sheet, which, with the assistance of his two fore-fingers, he raises, and by so doing allows the right hand also to grasp it at the top, in the same manner, which lifts the sheet carefully and expeditiously off the points, and nimbly twisting about his body towards the paper bank, carries the sheet over the heap of white-paper to the bank, and lays it down upon a waste sheet or wrapper, put there for that purpose; but while it is coming over the white-paper heap, though he has the sheet between both his fore-fingers and thumbs, yet he holds it so loosely, that it may move between them as on two centres, as his body twists about from the side of the tympan towards the side of the paper bank.

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* The description of this complicated motion, applies wholly to the two-pull presses.

Thus, both the pressman's hands at the same time are alternately engaged in different operations; for while his right hand is employed in one action, his left is busy about another; and these exercises are so suddenly varied, that they seem to slide into one another's position, beginning when the former is but half performed.

*Having thus pulled a sheet, and laid it down, he turns his body towards the tympan again, and, as he is turning, gives the next sheet on the white-paper heap a touch with the back of the nail of his right thumb, as before, to draw it a little over the hither edge of the heap, and lays it on the tympans, &c. as he did the first; and so successively every sheet, till the whole heap of white-paper be worked off.

As he comes to a token sheet, he undoubles it, and smooths out the crease with the back of the nails of his right hand, that the face of the letter may print upon smooth paper. And being

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* The description now becomes general for all presses.

printed off, he folds it again, as before, for a token sheet when he works the re-iteration.

Having worked off the white-paper of twelves, he places his right hand under the heap, and his left hand supporting the end near him, turns it over on the horse, with the printed side downwards: if octavo, he places his left hand under the heap, supporting the outside near end with his right hand, and turns it one end over the other; all turning of the paper for re-iteration is regulated by this principle, and called by the pressmen *twelves-ways*, or *octavo-ways*. In performing this operation, he takes from the heap so much at once as he can well govern, without disordering the evenness of the sides of the paper, viz. a token or more, and lays that upon the horse; then takes another lift, and so successively, till he has turned the whole.

Having turned the heap, he proceeds to make register, which he does by laying one of the sheets just printed on one side, upon the tympan sheet, for a register sheet, and a waste sheet over that to keep it clean from any filth the face of the letter may have imprinted upon it, and pulls these two sheets. Then he runs out the carriage or table, lifts up the tympan, and takes off the two sheets, laying the waste sheet by; but turns the other side of the register sheet, to try how the impression of the sides of all the pages agrees, and lies upon the impression in the first-pulled side. If he finds they agree perfectly well, register is made. But if the impression of the last-pulled side of the register sheet stand not even with the impression of the first-pulled side, either the whole length of the sheet or part, he observes how much it stands uneven; then he loosens the quoin or quoins on the further side of the coffin, and removes them backwards till they stand the proper distance off the sides of their respective corners; then knocks up one or both the opposite quoins, till he has removed the chase, and in consequence has forced the opened quoin or quoins close against their corners. Or if the impression of the last-pulled side stand within the impression of the first-pulled side, he observes how much also, and loosening the hither quoin or quoins, and knocking up the opposite as before, makes register for the sides of the sheet.

He next observes how the register of the head and foot agree; and if he find they agree on both sides the short cross, he has good register, supposing the compositor to have performed his office, by making all his pages of an equal length, &c.

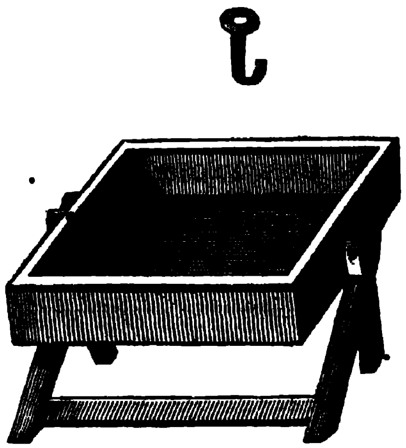
If the impression of the last-pulled sheet lie without the impression of the first-pulled sheet, towards the upper or lower end of the tympan, he opens the quoins at the respective end, and knocks up the opposite till he has made register; to try which, he pulls another clean register sheet as before, and if he find register agree on all sides of the forme, the task is performed; if not, he alters it till it does.

But it sometimes happens that the compositor has not made the white exactly equal between all the sides of the crosses; in this case, altering the quoins will not make good register; the pressman therefore observes which side has too much or too little white, and, unlocking the forme, takes out or puts in such a number of scaleboards as he thinks will make good register, which he tries by pulling a sheet, and if it be necessary, alters it again, till he has pulled a sheet with good register.

Having made register, he proceeds to work it off; but he somewhat varies his posture in laying on the sheet; for, as before, when he worked white-paper, he caught the sheet by the upper further corner with his right hand, he now, having taken up the sheet, catches it as near the further side of the further point hole as he can, with the ball of his right-hand thumb above the sheet, and the ball of his fore finger under the sheet, the readier to lay the point hole over its respective point; which having done, he slips his body a little backwards, and both his hands with it, his right hand towards the near point hole, with the back of the nails of his fingers to draw or stroke it over the point; and the fingers of his left hand, as they come from the further corner, nimbly slipping along the bottom edge of the sheet, till they come to the hither corner; and then with his fore-finger and thumb lays hold of it, in order to guide the point hole on that point also; then pulls that sheet, as before, as he did the white-paper, and so successively all the rest of the reiteration. The token sheets, as he meets with them, he does not fold down again, as he did the white-paper.

§ 12. *The Lie-Trough.*—The forme being worked off, it becomes the pressman's duty to wash it clean and free from every particle of ink, not only for the cleanly working and well standing of the letter in the subsequent composing, but to save his own time in making ready when the same letter gets to press again; for if a pressman is at all remiss in this duty, either after working his formes, or pulling proofs, he will be at last obliged to do it, and wait the drying of the forme, before he can go on with his work in a fit and proper manner. Many an hour is lost from a pressman not bestowing a minute or two in thoroughly cleansing and rinsing his forme.

For this purpose, every printing office is provided with a lie-trough, suspended on a cross frame, and swinging by iron ears fixed something out of the precise centre, so as the gravity of the trough will cause it to fall in a slanting position.



This trough is lined with lead; the top front edge being guarded from the pitching of the formes by a plate of iron; and a moveable board is placed at the bottom upon which to rest the forme. The forme having been placed in a slanting position, on the further side of the bottom board, so as to cause the trough to swing over to the opposite side from which he stands, he takes hold of the rim of the chase by the key, or instrument for that purpose, and laying it gently down, sluices, by means of swinging the trough on its pivots, the *lie* (of which a sufficient quantity is always kept in the trough) two or three times to and fro, then taking the *lie-brush*, he well applies it to the whole forme, type, furniture and chase; and raising it to drain, he lifts the forme out of the trough into the sink, and then with clean water, rinses off the lie, and leaves the forme, in the appropriated place, to drain. With the completion of this process the pressman's responsibility for his forme ceases.

The *lie* is made of the strongest American pearl-ash. A large earthen jar is usually chosen for the purpose. The proportion is one pound of ash to a gallon of soft water; it should be stirred with a large stick till dissolved; the larger quantities in which it is made, and the longer it stands, the stronger it becomes. The jar should have a cover fixed on the head, with lock and key.

The lie-brush is made very large: the hairs close, fine, and long, in order not to injure the type, while sufficient force is applied to search every interstice of the letter, down to the spaces and quadrats, where the ink can have insinuated itself.

§ 13. *Of Wetting Paper.*—Paper is wetted in a trough full of clean water. The pressman places the dry heap on his left hand, and a paper-board with its breadth before him, laying first a wrapper or a waste sheet of paper on the paper-board, that it may not soil the first sheet of the heap. Then he takes up the first token, and lays it with the backs of the quires towards his right hand, that he may the more readily catch at the back of each quire with that hand; he lays that token across the rest of the heap, that he may the more easily know when he comes to the end of it.

He takes a quire, by the centre of the back, in his right hand, and the edge of it in his left, and lays it down upon the waste sheet, opens it, and lays on it a few sheets.

Having laid down his dry laying, he takes the remainder of the quire off the dry heap, with the back of it in his right hand, and the edge of it in his left, as before, and closing his hands a little, that the quire may bend rather downwards between his hands, he dips the back of the quire into the left-hand side of the trough; and discharging his left hand of the quire, draws it through the water with his right; but as the quire comes out, he quickly catches the edge of it again in his left hand, and brings it to the heap; and by lifting up his left hand, bears the under side of the quire off the dry paper, laid down before, lest the dry sheet should stick to the wet before he has placed the quire in an even position, and so perhaps wrinkle a sheet or two, or else put a dry sheet or two out of their even position. But this drawing the quire through the water, he performs either quick or slow; if the paper be weak and spongy, he performs it quickly; if strong and stubborn, slowly. To place this quire in an even position, he lays the back of it exactly upon the open crease of the former, and then lets the side of the quire in his left hand fall flat down upon the heap, and discharging his right hand, brings it to the edge of the quire; and with the assistance of his left thumb, still in its first position, opens or divides either a third or half of the whole quire according to the quality of the paper; then spreading the fingers of his right hand as much as he can through the length of the quire, turns over his opened division of it upon his right-hand side of the heap.

Drawing, and plate papers, being occasionally used by the letter-press printer, it is proper to point out that a different process must be used in the wetting. These papers are usually sent in from the stationers quite flat; that is, not folded into quires or half quires, but divided into quires by little slips of paper. The best method of wetting these papers is to use a brush, such as is called a banister brush; and instead of dipping the paper into the trough, lay it down by the side, and dipping the brush into the trough, give it a gentle shake to take off the superfluous water: then, by a quick motion, carry it to the heap, taking the middle first, and passing it over the whole surface to give an equal degree of moisture to all parts: and continue to follow up the process upon the same principles as in wetting paper after the ordinary mode, as before described. The drawing-paper being very hard-sized in the making, will require the brush, and much water, three, four, or five times a quire; while plate-paper will take as little water as it is possible to give it, so as to cover it all over; and twice a quire will often be too much. This same mode must also be adopted in wetting paper of extraordinary large dimensions.

Having wet his first token, he doubles down a corner of the upper sheet of it on his right hand, so that the further corner may lie a little towards the left hand of the crease in the middle of the heap, and that the other corner may hang out on the near side of the heap, about an inch and a half; this sheet is called the token sheet, as being a mark for the pressman, when he is at work, to know how many tokens of that heap are worked off.

Having wet the whole heap, he lays a wrapper or waste sheet of paper upon it, that the paper-board may not soil the last sheet of the heap; then, three or four times, takes up as much water as he can in the hollow of his hand, and throws it over the waste sheet, that it may moisten and soak downwards into the unwet part of the last division of the quire; after which he places the label which the warehouse-man must always furnish for each bundle, and upon which is written, in legible characters, the title of the work, the number to be printed, and the date of wetting, in the heap, one half hanging out, so as to be easily read.

The paper being thus wetted, he takes up the whole heap upon the paper-board, and sets it by in a part of the room, appropriated for that purpose, and lays another board upon it; and upon the middle of the board sets about half a hundred weight, and lets it stand by to press, commonly till next morning; for pressmen generally wet their paper after they have left work at night. All wetted paper would be better if it were separated and turned in the course of the following morning, and pressed again for seven or eight hours.

But the wetting of paper must, in all cases, depend entirely upon its fabric: and since the printer has seldom, when employed by a bookseller, the choice of the paper, it will require all his skill and patience to adopt his labours to the material upon which he is to work. The paper for fine work must increase in firmness of texture, as the ink is increased in fineness and tenacity. To attempt doing fine work upon common paper is but throwing away time and expense. A paper to take the best ink must be made entirely of linen rag, and not bleached by any chemical or artificial means. The fine Kentish hand-made paper, fabricated a sufficient time to get properly hardened, and well and equally saturated with size so as not to imbibe more water in one part of the dip than in another, nor resisting the water like a duck's back, is what I have found most suitable for fine printing. The paper having been wetted with the greatest care as to equality of water, should be pressed for twelve hours, and then carefully turned by each two or three sheets so as no lift be relaid in the same position with respect to the adjoining lift; at the same time every fold and wrinkle must be carefully rubbed out by the action of the hand, so that nothing but a flat and even surface shall remain: the heap should then be pressed for another twelve hours in a screw press; and it will be in good order for working.

A truly scientific method of wetting paper has been practised by Mr. John Oldham, the director of the printing department of the Bank of Ireland. The difference in quality of the material on which a book-printer has to work, leads me to doubt the practicability of applying such a mode to general purposes; yet, as it may perhaps afford some useful hint to a philosophic printer, I shall give the best account I have been able to collect of his apparatus and process.

The apparatus consists of a large cast-iron box, the lid of which is made to shut with an air-tight joint. A reservoir of water beneath the box, has communication with it by a perpendicular pipe which can be intercepted at pleasure by means of a stop-cock. The paper to be wetted is evenly piled in rail-work wooden boxes, which are placed so that the paper shall stand upon its edge in the cast-iron vessel, from which the air is drawn by means of an air-pump: and the stop-cock being then opened, the atmospheric pressure upon the surface of the reservoir of water causes a portion of it to rise through the pipe into the box exhausted of air, and to instantly infuse itself minutely and equally into the paper. The air is now admitted by opening a valve, and its pressure forces the water into the paper, which is then taken out of the vessel, lying as even in the rail-work, one sheet upon another as it was first placed when dry. The superfluous moisture is next to be expressed by means either of a vertical screw and lever, or revolving cylinders properly adjusted (with great weights and levers to maintain the pressure), so as to admit any quantity of paper, little or much, between them. Thus, in a few minutes, by this process, as much paper can be wetted and made ready for working as the iron vessel will contain.

This method of damping appears to me likely to answer every purpose for peculiarly fine, hard-sized, unfolded paper: but I should never venture any expense or trouble in the experiment for the sad stuff we are obliged to manage and use as paper. "Once a quire, and quick through the trough," is often the word of command to wetters of the tender-made article, as it is put into their hands. I should expect, if a vessel were charged with reams of this sort of paper, to find it decomposed, and the pulp floating in a liquid made milk-white by the gypsum and bleach.

I must be allowed, before closing this article, to pay a tribute of respect to the talent manifested by this brother printer in the great cause of humanity, by the perfection to which he has brought the mode of forming and printing a Bank-note, which he has rendered so difficult of imitation that no instance of the entire forgery of their bills* has occurred since he has had the direction of this department of the Bank of Ireland. In the investigation by the Society of Arts, set on foot for the purpose of ascertaining the best mode of preventing forgeries of Bank of England notes, the specimen of the Bank of Ireland was held prominently forward as a sample, and a circumstance calculated to reflect most severely, by contrast, upon the conduct of the directors of one of these two great national establishments.†

§ 14. *Making of Pelt or Skin Balls.*—The skins of sheep, or pelts, in the state immediately after the hair has been taken off by the lime process, are used for this purpose; and such are chosen as have a strong grain, and the grease well worked out of them. They are purchased either wet or dry; if dry, they are put to soak in chamber-lie. One skin generally makes two proper-sized balls. When the skin has soaked sufficiently, which will require about fourteen or fifteen hours, it is taken out of the lie, and *curried;* that is, by putting the skin round the currying iron, or any upright post, taking hold of each end of it, and drawing it with as much force as possible, backwards and forwards, against the post, which discharges a good deal of the water and lime, and renders it more pliable; the skin is then cut exactly in half and trodden on, until not the smallest drop of water is discoverable, or until it sticks to the foot in treading. The skin is then laid on a wetting board, or a vacant press stone, and stretched, by rubbing the ball-stock on it, as much as possible. The pressman then places a lining (which is a worn-out skin, and which has been previously soaked, but not trodden) on the skin, with some refuse ink to make them adhere, and nails them with one nail to the ball-stock; he then proceeds to lay the different cardings of the wool one upon the other, crossways, till he has sufficient for the ball; he then takes it up by the bottom corners, and grasps it into a circular form, with which he fills the ball-stock, then brings the skin opposite the part already nailed, and makes that also fast with another nail. He then puts two nails immediately opposite each other between the fastenings already made, and proceeds to put the skin in plaits, about an inch wide; through each plait a nail is driven; the superfluous skin should then be cut off, within half an inch of the nails. Balls are well knocked up, when the wool is so placed as to form a full even face, that every part of the skin may bear upon the letter; not rising in hillocks, or falling into dales; not having too much wool in them, for that will render them soon hard and uneasy for the pressman to work with; or too little, for that will make the skin, as the wool settles with working, soon flap, and wrap over into wrinkles, so that he cannot so well distribute the ink on his balls.

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* In 1821, two criminals were executed at Monaghan, for altering the *sum* of an Irish Bank-note, but which is now rendered, perhaps, impossible by the use of thinner paper, which the apparatus for wetting, here described, enables Mr. Oldham to use.

† See Trans. Soc. Arts, vol. xxxviii, 1819.

Having knocked up the balls, he dips them into the lie, and immediately scrapes them with the ball knife, in order to make them perfectly clean; he then procures a clean sheet of stout paper, and puts it on the ball, and continues rubbing and patting it till the ball is perfectly dry, which is considered to be in that state when it will readily take the ink on every part of it. Having thus dried the balls, he proceeds to take ink; and if he finds that scarcely any of the skin is black, he is sure it is not sufficiently dry; he then returns again to drying it with paper, or burns a piece of waste paper, and waves his ball to and fro over the flame of it, but so quick and cautiously that he neither scorches the leather nor dries it too much; in winter, when a fire is at hand, he dries it gently by the fire. If the balls are greasy, they should be frequently rubbed up with the pelt blankets, and well scraped; and dried, as before, with paper.

The invention of a composition for coating the face of canvas balls and wood cylinders, has superseded the necessity of the filthy, troublesome, uncertain process of forming and keeping in order the balls above described. A full description of the composition balls and rollers, will be given in a subsequent chapter.

Printing Red, or other Colours, together with Black.

First, by Underlaying: When red and black are to be printed on the same sheet, the forme is made ready in the usual way, and a line traced all round the outside of the chace to shew the situation in which the forme must be replaced after it has been taken off the press.

The pressman then pulls a sheet in order to get those words or lines marked, which are to be worked red; while this is doing, he washes the forme thoroughly, as the least dirt remaining on it will destroy the beauty of that colour. The forme is then laid, with its face downwards, on a letter-board covered with a press blanket. Those words marked to be red are then forced down (which the soft and spongy nature of the blanket readily admits of), and nonpareil reglets nicely fitted into the vacancies, which raise the red lines and words all of an equal distance from the other matter. A sheet of paper is then pasted on the forme, which keeps the underlays in their proper places. The forme is again laid on the press, observing the utmost care in placing it, agreeable to the marks before made on the stone. It must then be made perfectly fast to the corner irons, as it is highly important that it remain firm and immoveable during its stay on the press. The frisket (which is covered with parchment), is then put on, the forme beat over with red ink, and an impression made on the frisket. The words so impressed are then cut out with a sharp-pointed penknife, with so much nicety as not to admit the smallest soil on the paper from the other matter.

The red being finished, and the forme washed, the compositor unlocks it (which is best done on the imposing stone, as the pressman can easily replace it, by the marks made on the press), and draws out the red words, filling up the space with quadrats. When this is done, the pressman cuts out the frisket for the black.

An extra pair of points are used to prevent the black from falling on the red, which is termed *riding*.

When a very extensive number is to be printed, as in Moore, Goldsmith, the County, and other almanacks, two formes are generally used, one for the red, and another for the black; the greatest care being taken by the compositor to have quadrat lines corresponding with every line in the black, and lead of equal thickness to cut for every rule.

There is another method of placing the underlays, which is adopted for broadsides, &c. with large letter, and with perhaps only two or three lines of red in them. The red lines are taken out on the press stone, and the underlays put in with a bodkin, upon which these lines are placed, and the frisket cut out as before mentioned.

I have lately adopted this plan, varied in a trifling degree, with much success in smaller type. Having drawn out the lines or words, I place in the vacancy m-quadrats laid down length-ways, cutting them, if necessary, to proper lengths; and filling up with quadrats. The black having been worked, then, by means of the bodkin, draw out the quadrats, and place in the words to rest on the horizontal laid m-quadrats: then lock up and work the red.

But the most effectual mode of printing in red and black from the same forme, has lately been invented by my father for printing the returns made to the House of Commons of Charitable Donations. For this purpose he has a type cast, which, from its application, he has named *rubric*, the peculiarity of which is, its being cast with a longer shank, or body, so as to stand higher to paper by the square of its own body, than other type. The work being composed in the usual manner of common type, and the proofs having been read and sent out, such parts are marked by underscoring with red, as are to be worked red; when ready for press, such parts are taken out, and their places filled with quadrats. Then the parts so taken out are reset in rubric; and when the black has been worked, the quadrats are withdrawn, the rubric type inserted, and then worked in red.

Pelt-balls having been once used for black, cannot be employed for any other colour; and as printing with red, &c. is but rarely performed, the balls for that purpose may be made of old parchment, well soaked, which may be done in a few minutes. These balls are made without stocks, and of a small size. For almanacks, broadsides, &c. where a large number is printed, balls are made in the usual way, or composition balls or rollers provided.

Mixing and Grinding Colours with Varnish.

Varnish is the common menstruum for all colours used in printing. Vermillion, with a small portion of lake, produces a beautiful red, which should be well ground with a muller on a marble slab, till it be perfectly smooth. If it be in the smallest degree gritty, it clogs the forme, and consequently produces a thick and imperfect impression; no pains should therefore be spared to render it perfectly smooth; it may then be made to work as clear and free from picks as black. A cheaper red, but not so brilliant, may be prepared with orange mineral, rose pink, and red lead.

The Prussian blue makes also an excellent colour, but will require a good deal of time and labour to render it perfectly smooth. It is also ground with the best varnish, but made considerably thicker by allowing a greater portion of colour with the same quantity of varnish, than the red; it will then work clear and free from picks. As this colour drys rather rapidly, the balls will require to be frequently scraped.

Other colours may be made, viz. lake and russet, which produce a deep red; verditure and indigo, for blues; orpiment, pink, yellow ochre, for yellows; verdigris and green verditure, for green, &c. All these colours should be ground with soft varnish, being in themselves dryers, or they will so choke up the forme, as to require it to be frequently washed, as well as dry and harden the balls, and soon render them useless.

The best colours for printing are those of the lightest body and brightest colour.

It will sometimes be necessary to use boiling lie, for washing the formes printed with these coloured inks.

Rules and Remedies for Pressmen.—Of Proofs.

It is the business of the pressman to pull proofs whenever they are wanted; but a very heavy, and, in my opinion, unjust tax it is upon him. In most offices of any extent, a spare press is generally placed in some part of the composing room, and called, the proof-press. The slovenly manner in which proofs are too often pulled, cannot be sufficiently reprobated. It is the duty of the corrector to notice whatever appears faulty or defective in the type; consequently, upon dirty, or almost illegible proofs, the marks will be numerous, and the trouble and loss of time to the compositor great and vexatious, and of serious consequence to the master; for a compositor, having gathered among the corrections the letter so marked, will find it much less trouble, when he has drawn out the supposed faulty letter, to give it the *coup de grâce* on the side of the stone or chace, lest it should again be the cause of similar trouble, consign it at once to the old shoe, and replace it by the one ready in his hand, than to ascertain, by a nice and critical examination, whether it is, or is not, defective, and then to return the gathered letter into his case. This is not the greatest evil; the most attentive and careful reader will not, in such proofs, be able to discover real faults; and therefore, no proof should be received by the reader that has not been pulled perfectly clean and legible; the pressman would then be obliged to take some pains in this respect.

After a proof has been made, the forme should be well rubbed over with clean lie, for this purpose a pan of lie and a brush is kept under or near each proof press.

Of the Work.

About every three sheets a small quantity of ink should be taken,* and during the intervals in which the beater or roller is not employed in braying out or taking ink, he should be overlooking the heap in order to detect any want of uniformity in the colour; to observe if any letters, quadrats, or furniture rise; that no letters are drawn out, or battered; that the register be good, and the work free from picks: during this examination, the balls must be distributed as much as possible.

When, through carelessness, too much ink has been taken, it should be removed by laying a piece of clean waste paper on one of the balls, or on the roller, and distributing till the ink is reduced to the proper quantity.

If letters, quadrats, or furniture, rise up and black the paper, put them down with the bodkin, and lock the quarter up tighter.

If any letters are battered, the quarter they are in must be unlocked, and perfect ones put in by the compositor.

When bearers become too thin by long working, they should be replaced by thicker ones.

When the forme gets out of register, which will often happen by the starting of the quoins which secure the chase, it must be immediately put in again, as there can scarcely be a greater defect in a book than a want of uniformity in this particular.

If picks, which are produced by bits of paper, skin, or film of ink and grease, or other filth, get into the forme, they are removed with the point of a pin or needle; but if the forme is much clogged with them, it should be well brushed over with clean lie, or taken off and washed in the lie trough: in the first case, before the pressman goes on again, it should be made perfectly dry by pulling a waste sheet or two, in order to suck up the water deposited in the cavities of the letter, in the latter it must stand some time to drain and dry before he again lays it on the press.

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* This will be subject to considerable variation from the nature of the individual work, and quality of the ink; a forme of large type will require the taking of ink every sheet; some book-work, of heavy composition, every two sheets; light formes, three or four sheets; and again, very fine work, every sheet, in order to keep the colour perfectly alike of every sheet.

The puller should habituate himself to glance his eye over every sheet as he takes it off the tympan; this may be done without retarding his progress: by following this plan, he will be enabled to detect imperfections which may escape his companion.

In order to ensure uniformity in receiving ink from the block, care should be taken, when balls are used, to bray out at the edge of the block small quantities at a time. While this is doing, the balls must rest on the ball rack, with the right hand on the upper ball-stock handle.

Torn or stained sheets, met with in the course of work, are thrown out and placed under the bank; but the pressman should be particularly careful to have them supplied by others from the warehouseman. Creases and wrinkles will frequently happen in the sheets, through careless wetting of the paper; these should be carefully removed, by smoothing them out with the back of the nails of the right hand.

In twelves, and other works at two-pull presses, where the platten pinches twice upon the centre pages, mackling or doubling the impression frequently happens; the following, among many others, are the causes of, and remedies for this evil.

It happens when the face of the platten and the inner tympan are both dirty, which occasions them to stick—they should always be kept perfectly clean.

Slack or rickety tympans will also cause doubling; and leaning the body against the carriage in reaching the bar, in presses without guide cramps, or where the cramps do not act with truth.

*The nut being loose in the head will also occasion this defect; the short bolts should be screwed up as tight as possible.

*If the platten be slack, or otherwise improperly tied up, this defect will always happen; also doubling will happen from the

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* These paragraphs apply wholly to the joiners' presses.

following causes, which must be remedied by the joiner and smith: viz.

*When the tenons of the head are so narrow as not to fill the mortises in the cheeks.

*The nut and garter so worn as not to admit the spindle to work close in them.

*The hose not working easy and steady in the shelves.

*The wheel on the spit not well justified, and its having too much play in the ear, which causes an unpleasant check.

The paper being rather too dry will also sometimes cause the impression to mackle.

Slurring and mackling will frequently happen when the tympans are carelessly and suddenly put on the forme: they should always be laid down easy, and the slur screw made proper use of.

Leaning against the carriage, as before mentioned, will also cause a slur.

If the platten rub against the rail of the tympan, it will inevitably cause a slur and mackle. This can easily be remedied by moving the tympan joints so as to clear the platten.

The ear of the frisket being so long as to cause it to rub against the cheek, always produces a slur: remedy—make it shorter.

Loose tympans will at all times slur the work; great care must therefore be observed in drawing them perfectly tight.

Independently of the above causes, slurring and mackling will sometimes happen from causes which baffle all art and patience to detect. It will be better in this case to tie as many cords as possible across the frisket, which will keep the sheet close to the tympan.

In the Stanhope presses it generally arises from the screw in the back plate becoming loose—the remedy is simple—screw it up again.

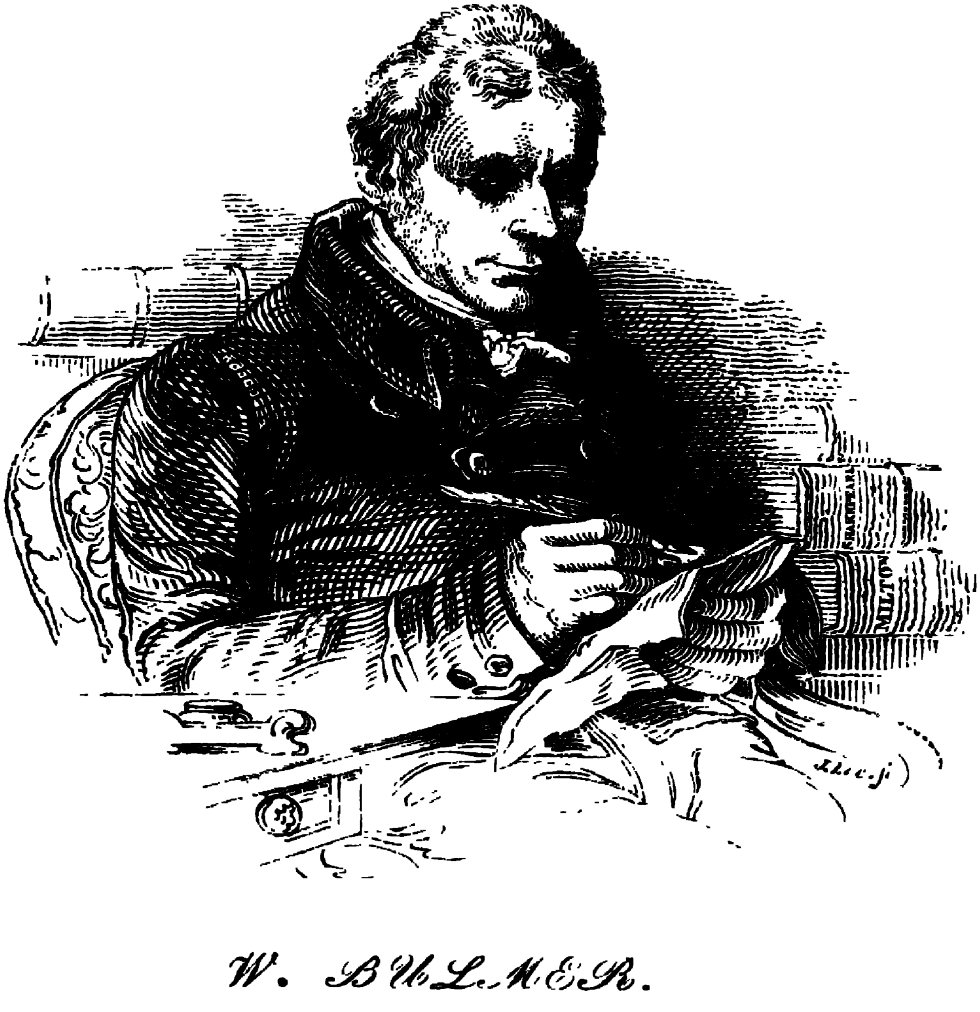
Before the pressman leaves his work, he covers his heap. He first turns down a sheet like a token sheet, where he leaves off, then puts a quantity of the worked off sheets on it, taking care to have the printed side upwards, that his companion, if he have any, on coming to work first in the morning, may not be deceived in taking it for the reiteration. Laying the blanket on the heap, after leaving off work, is a bad custom. If the paper be rather dry, it will be better to put wet wrappers on it. The blankets should always be kept as dry as possible, that they may not make the inner tympan damp and slack.

The pressman's next care should be to look after his balls. They should be well rubbed with a blanket soaked with lie, if they are inclined to be hard, that they may be in proper order for the next day's work. They must be left well covered up with the blankets; but if they are already sufficiently soft, they will not require rubbing, and what is termed a dry blanket will answer the purpose, viz. one from which the water does not run. When the balls have been over-soaked, they should be left on the rack all night, with merely a piece of paper round them, as they will not bear the process of what is termed *capping*.

The pressman next observes whether his forme be clean; if so, he puts a sheet of waste paper between the tympan and frisket, and lays them down on the forme: if it be dirty, it must be rubbed over with clean lie. On his return to work in the morning, he takes care to wet the tympan, but not for very light work. If there should happen to be any pages in the forme particularly open, those parts of the tympan where they fall must not be wetted.

As the mode of reckoning press work by "tokens" and "hours," is sometimes difficult to those who have not daily practice, I shall give a table, which perhaps may save trouble. 250 is a token; each token, in ordinary work, is reckoned an hour, and it is equally correct to say, technically, that a forme is so many token, or so many hours: thus, 2,000 is 4 token, or 4 hours one side—8 hours, or 8 token perfect, and the price for this is so many token for each man; so that 1,000 in price, is 16 times the sum at which the work is paid per hour.

Sheet Perfect.	Hours.	4½*d.*		5*d.*		5½*d.*		6*d.*
		s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*
250 . .	4	1	6	1	8	1	10	2
500 . .	8	3	0	3	4	3	8	4
750 . .	12	4	6	5	0	5	6	6
1,000 . .	16	6	0	6	8	7	4	8
1,250 . .	20	7	6	8	4	9	2	10
1,500 . .	24	9	0	10	0	11	0	12
1,750 . .	28	10	6	11	8	12	10	14
2,000 . .	32	12	0	13	4	14	8	16



W. BULMER.

FINE PRINTING.

CHAPTER IV.

Of Fine Printing—Baskerville—Ritchie—Bulmer—Bensley—M'Creery—Bad Effects on other Work—Small Type—Various Notions of Fine Printing—Wood-cut Working—Obstacles to Fine-work—Mutation of Taste in the Form of Types—Monstrosities of 1824*—Requisite Materials for Fine Printing.*

IT must be gratifying to those immediately interested in the advancement of the liberal arts, and the professions connected with them, as well as to those who contemplate them with a patriotic regard, to witness the present state of British typography. Baskerville, many years ago, gave the first impulse to improvement; and it has since continued to increase through almost every part of the kingdom. As it was found very difficult to obviate some of the impediments which retarded our early improvement, the printers of the continent, who, from being less subject to the versatilities of climate, and from other circumstances, already mentioned in a former chapter, had a clearer path before them, took the lead for a considerable time in beauty of workmanship. Hence the works of several foreign printers have acquired them a distinguished celebrity throughout the learned nations at a much earlier period of the art, (see p. 301): but there is a satisfaction in reflecting that names are now to be met with among our own countrymen, as eminently celebrated in this admirable art as those of any who have been before them. By those only who have attempted to carry the art to perfection can the attendant difficulties be truly conceived: and, after the toil of years in the pursuit, how few the instances where fame has been the reward, how still more limited those where opulence has been the harvest of the toil.

Baskerville succeeded in producing a type of superior elegance, and an ink which gave peculiar lustre to impressions from his type. The novel and unusual excellence which his works presented gave a stimulus to the exertions, and drew forth the emulation, of many of our countrymen. The first who started in this novel course was Mr. Millar Ritchie, a native of Scotland. About 1785 he carried on business in Albion Buildings, Bartholomew Close. An edition of the classics, in royal octavo, consisting of the works of Sallust, Pliny, Tacitus, Q. Curtius, Cæsar, and Livy, was the work upon which this leading attempt at superior printing was made, at the expense of the Rev. Mr. Homer, senior fellow of Magdalene College, Cambridge, who subsequently disposed of the whole impression (excepting those reserved for presents) to the bookseller, Mr. Thomas Payne. This work was also the means of first introducing Mr. Whatman's yellow wove royal paper. The next work was a quarto bible, in two volumes, upon the same paper, and two unique copies upon India paper, printed on one side only. A curious circumstance attended the printing of this bible: when it was far advanced toward a conclusion, the two Universities, and the king's printer, obtained an injunction to prevent its progress: just at this period some person was printing a bible at Dublin, under the title of "Jackson's Family Bible," (without notes). Jackson, who was the university printer at Oxford, brought an action against the Irish printer. It was solemnly argued, and the Irish court determined that a restriction upon printing authentic copies of the Scriptures was not good, and the bible was proceeded with. Upon this Mr. Ritchie also took the liberty to proceed with his bible, and no more was heard of this injunction.

Another work executed by Ritchie, with uncommon splendour and expense, was "Memoirs of the Count de Grammont," a small page, upon quarto, 1500 copies small paper, 500 on Whatman's wove royal, one copy on vellum, and three copies having this diminutive quarto page worked in the centre of a whole sheet of the royal paper.

On his first diverging from the beaten track, Mr. Ritchie encountered considerable difficulties. The paper-maker, Mr.

J Lee. Sc
RITCHIE

Whatman, and the ink-maker, Mr. Blackwell, contributed, most successfully, all their skill to his laudable design, but the want of journeymen to enter into the spirit of the undertaking with that extraordinary exertion of care and ingenuity which it indispensably required, was a difficulty the most discouraging, which he had long to contend with, and never wholly conquered; men he could get who by bodily strength would pull down the press, and give the impression, but the giving the colour required a skill and patience so far exceeding what pressmen had any idea of in this country, that Mr. Ritchie found himself obliged to manage the balls and beat every sheet of those works with his own hands. He had men to pull, but every other part was effected by his own personal labour.

I have a copy of his bible now lying before me, and will venture to affirm, that in every requisite constituting good printing,—in richness and equality of colour throughout every page,—in that contrast of tints upon which the eye can dwell without fatigue, by the colour of both ink and paper,—it has not been surpassed by any work that has followed. It bears the date of M.DCC.XC.V. for John Parsons, Paternoster-row.

What this living father of English fine printing may have been in personal appearance in those days, I have no means of showing; but what he is at the present day, when called from my warehouse, and from handling the sheets of this very work, to sit for his portrait, may be here seen.

It will hence be evident that Mr. Ritchie, notwithstanding all his perseverance and skill in fine printing, had not the art of getting independence by his labours: he failed in business, and was succeeded in his efforts by Mr. Bulmer: Mr. Bensley and Mr. M'Creery followed, and from the presses of those gentlemen have issued some of the finest specimens of typography which this or any other country has produced.* Emulation is a powerful principle in our nature, and the success which has attended their exertions, contributed in a great degree to give a new tone and character to the profession. The first efforts at fine printing tended to any thing but a general improvement in press-work.

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* It will not be thought foreign to the subject to observe here, that about this period Mr. Bell, in publishing his British Theatre, first set the fashion, which soon became general, of discarding the long ſ.

Every thing that was not paid for as "fine work" was "common work;" and by the pressmen, who, at the time alluded to were more masters of the trade than their employers, it was treated accordingly, perhaps for the sake of making the contrast the greater. Subsequent events, arising from the conduct of the workmen, together with the general introduction of the Stanhope and other improved presses, as well as machinery, having placed the choice of their workmen once more in the power of the masters, the general style of printing has become much improved.

Printing in very small type, below Brevier, has been pursued to a great degree of excellence but by very few printers. Mr. Rickaby,* the predecessor of the author of this work, was among the first who turned his attention to the beautifully minute. An annual work, of the pocket-book class, called "Peacock's Polite Repository," and a pocket dictionary, called "Peacock's Johnson," were among the best efforts of his ingenuity. Mr. Charles Whittingham, in small editions of the "Common Prayer," was eminently successful; but the "Diamond Bible" and "Prayer Book," by Mr. Corrall, in the beauty of eye-straining minuteness, surpassed all others, and took the lead of future efforts.

The great improvements in type-founding have proved an additional spur to the printer; and fine printing has of late been attempted by so many professors of the art, and so numerous and variable are the specimens they have produced, that a discrimination as minute as that which is required in forming an opinion of those of the pencil and the burin, seems necessary in judging of what is really superior in typography. Some printers imagine, if they do but make their pages sufficiently black, that the end is gained; others, if they are pale and clear; so that each exhibits a style peculiar to his own fancy. In typography, as in the fine arts, it is difficult to specify and investigate the qualities which constitute excellence and beauty; yet to an accurate observer, the productions of the several typographical artists vary as much as the figures of Flaxman, Chantry, or Canova, from the rude efforts of a rustic stone mason. Real excellence does not, however, depend upon so unfixed a principle; and, therefore, it would be difficult to point out every particular which it is necessary to combine, in order to accomplish that which may rank as a *chef-d'œuvre* in the art; yet to understand when it is effected is not so intricate; for when any one who has acquired a correct taste, sees a beautifully uniform type imparted to the paper, displaying all its proportions with a just degree of lustre and harmony, his conceptions of typographic beauty become satisfied, and the more he looks the more he admires.

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* "Mr. Thomas Rickaby, of Peterborough Court, Fleet Street, died August 21st, 1802, Ӕt. 49. He printed The British Critic, and was, in many other respects, a printer of eminence."—*Nich. Anec.* iii. 737.

The printers who have paid most attention to fine printing have endeavoured to produce that delicacy and sharpness of appearance on paper which is peculiar to the copper-plate work; but though such an effect may be very nearly approximated, it can never be perfectly attained, the impression being, as I have before remarked, accomplished by such completely different means. In seeking, therefore, after that which peculiarly belongs to another art, we are liable to a neglect of those excellencies which exclusively characterize our own; nor needs the mortification be very great that we cannot produce close imitations of copper-plate printing, when we see the difficult and abortive attempts of the copper-plate printer and engraver to imitate us; and when we consider how much more than the other our art is capable of performing. With proper materials, properly employed, the impressions from letter-press exhibit peculiarly fine relief and outline, which, in many respects, must be allowed to excel in beauty even the finest productions of copper-plate.

Those who have had opportunities of inspecting the early productions of the press, will be convinced that the art became retrograde in the course of time; for there are yet in existence works of the fifteenth and beginning of the sixteenth centuries, which, whether examined with regard to case or press, will bear a near comparison with any that are now produced. It has been previously remarked that printing, immediately on its invention, made singularly rapid advances to perfection, which may be easily accounted for by the facilities it afforded to the purposes of society, and more especially to the cause of literature; and the unexampled patronage it thus obtained, as being one of the most honourable vestibules to human glory.

The improvements which have taken place in all the arts connected with letter-press printing have acted, no doubt, powerfully in stimulating the printers of this country to that extraordinary exertion by which such fine specimens of typographic beauty are now so frequently produced. As engraving on copper and on wood progressively improved, it became necessary that the typography which accompanied them should not, by a coarse and common appearance, serve but to disgrace that which it should rival, and abridge the gratification which might be reasonably expected from a union of the arts.

Although the powers of wood-engraving are limited, yet, as an art most intimately connected with our own, its importance is worthy of being held in the highest estimation; and were we not to attempt to force it beyond its capabilities, its advantages would be more esteemed. In consequence of several first-rate artists having put their genius to the stretch, in order that their works might vie with copper-plate, a false taste has been produced. It is true that some have sent out very beautiful specimens, affording a vast variety; but how curious soever these productions may appear, yet, on a comparison with impressions from copper, they will be found different things. The two species of printing has each its peculiar feature, which it is a vain attempt for the other to strive to equal. The deep, soft, regular black ground which can be given to a broad surface by completely covering it with fine ink is a property of letter-press printing which the copper-plate can never be able to accomplish; and there is a receding in perspective, and a general sharpness of outline belonging entirely to the latter which it is impossible for the former fully to attain. As it is a natural consequence of the different methods of engraving and working off, it is a species of dissimilarity that can never be entirely prevented. In speaking upon this subject, the author of the Printer's Grammar said, " We are as much disappointed in examining a wood-engraving, in hopes of finding the softness of flesh and delicacy of skin which is produced by an artist on copper, as we are disappointed in not meeting in copper with that broad, deep shade, and strength of contrast which the engraver on wood may always exhibit." Now with regard to the great defect of wood-engravings in general thus spoken of, it is presumed that a considerable advance has been made towards perfection by the artist who executed the portraits exhibited in this work, in which that "delicacy and softness" required in managing countenances is conceived to have been very admirably achieved.

No kind of engraving is better calculated than that of which I am here speaking, to preserve the real outline and proportions of the designer. Indeed, this will be more easily credited when it is stated that he generally makes the drawing with pencil on the block; and the duty of the engraver is to leave those lines standing by cutting away the interstices with the greatest exactness possible. Thus, as the most unfinished etchings on copper of the ancient masters are more valuable than any imitations of them by a second hand, so are the powers of the engraver on wood preferable for giving, as far as drawing and proportions are concerned, a faithful transcript of the original design. The great point, therefore, seems to be, to consider properly what is the real province of the art, so that expectation may not be raised from it which, from its nature, cannot be gratified; and the art and the artist be unjustly depreciated in consequence of a disappointment which it is beyond the possibilities of either to prevent.

It may be necessary here to remark, that the difficulties attending the printing of wood-engravings are very considerable, and that, however the designer and the engraver may labour, should the printer not be a judge of the effect intended to be brought out, and know well how to manage his block, all his labour will be fruitless. This observation applies more particularly to the finer kinds of engraving, but in some degree to all. In this department of the art much depends upon the quality and colour of the ink; and the fine specimens that have been produced by the gentlemen previously named, as having signalized themselves by the high degree of perfection to which they have carried the art, were printed with ink made or improved by themselves. Ink, however, of late years has been manufactured in a much more satisfactory manner than it was formerly, yet perhaps not so as to have attained that positive perfection of which it is susceptible in order to work the finest engravings in the most finished manner.

It has been before stated that the printers on the continent (those of Parma and Paris in particular) have it in their power to produce finer specimens of printing than can be done by us. One of these advantages arises from the nature of their climate, which is not subject to the variations of temperature we daily experience, and which acts powerfully upon various preparations of the oil of which our ink is composed, disposing it at one hour to spread equally over the balls, or rollers, and at another rendering it so glutinous and stiff as to tear the surface of the paper, and defy the efforts of the pressman, without a great increase of heat in the place where he is working; and even should he raise the temperature ever so high, if the frost be intense, his endeavours will be fruitless. It is a curious fact, that heat will not entirely counteract the effects of a freezing atmosphere upon some kinds of printing ink.

But the chief obstacle to the production of fine printing, or indeed to any printing above the very commonest standard, arises from the present mode of manufacturing paper; this has been so much dwelt upon in a former part of this work,* that it would be tedious were it here repeated.

Taste, which is continually changing, has made strange revolutions in the form of our printing types; we no longer use the thin and meagre-faced letter of the Elzevirs, Baskerville, Martin, &c. with which our works were formerly printed. That there was ample room for improvement is sufficiently manifest, but the rage unfortunately ran into the opposite extreme, and nothing was considered handsome but that which exhibited as broad a surface as the dimensions of the body of the type would admit, in many instances forcing the letters so close together, that the word appeared an indistinct mass of black, not to be read with facility. This proved a short-lived fashion, and of benefit to no one, except the ink-maker. Another extravagance has been daily increasing upon us, from the desire of the letter-founders that their types shall stand well in line, and which is certainly a great perfection: in order to render this object more apparent, the horizontal line at the top and bottom of the letter, where it occurs, is carried so far out, on each side of the stalk, as to give the page somewhat the appearance of being ruled. Nor can the present general squareness of form and grossness of face be considered as removing any defect. The disadvantages attending such letter are manifold. Owing to the delicacy of the top and bottom lines, it will not last so long as that of the old fashion, the slightest use destroying these lines, and at the same time the newness of its appearance; besides, by exhibiting a much larger surface to the pressman, to be covered with ink, more beating is required, and a heavier pull, a duty which we rarely find men, striving in the ordinary course of business to make the best use of their time, willing to bestow, nor can we expect it, without increase of pay; and without this care, the effect produced is worse than that of letter from the old matrices. The public taste will, it is to be hoped, in time settle between the two extremes, and when that shall take place, we shall have the pleasure of seeing strength, grace, and lightness, exhibited on the same page.

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* See Section V.

This has, in fact, since the above was written, been the case. Most of the eminent booksellers now object to the use of the fat-faced type; and founders of the highest repute are vying in the production of letter with a face elegantly proportionate, and formed for durability and profit to the printer. The introduction of fat-faced types into book-work has been severely reprobated by many as well as the author of this work: yet, it must be admitted, that when cut with taste and ability, when quite new, when used in printing open and thick-leaded works, as poetry, &c., and when carefully worked, at twice or thrice the expense of common work, an effect brilliant and ornamental is produced; though not very congenial, perhaps, to the eyes of those who buy books to *read* them. The disrepute into which letter of this cut has fallen has probably arisen from the negligence, inattention, and want of taste with regard to shape and symmetry with which they were cut when first introduced. It has been already said, that in typography, as in the fine arts, it is difficult to investigate and specify the qualities which constitute beauty: but fatness seems to have been considered by the letter-founders as an adequate substitute for all such qualities.

At one period, in imitation probably of the celebrated Didot, a practice prevailed of cutting the ceriphs and fine strokes of types to an excessive degree of sharpness. This, though it gave to fine work and early impressions a neatness and finish resembling copper-plate, was very detrimental, as these sharp edges would not stand for any length of time the action of the press, but either broke off or were blunted, so that the fount soon acquired the appearance of age and long service.

But these extravagant fancies have had their day, and the shape of type is subsiding to a happy medium, likely to become a standard between the awkward stiffness of the Elzevir and Baskerville, and the outrageous kind of face only adapted for placards, posting-bills, invitations to the wheel of Fortune, and job-printing in general; and for which purposes it appears so appropriate as to induce a probable supposition that its use will be permanent in that class of printing.

Fashion and Fancy commonly frolic from one extreme to another.* To the razor-edged fine lines and ceriphs of type just observed upon, a reverse has succeeded, called " Antique," or " Egyptian," the property of which is, that the strokes which form the letters are all of one uniform thickness !—After this, who would have thought that further extravagance could have been conceived ? It remains, however, to be stated, that the ingenuity of one founder has contrived a type in which the natural shape is reversed, by turning all the ceriphs and fine strokes into fats, and the fats into leans.—Oh ! sacred shades of Moxon and Van Dijke, of Baskerville and Bodoni ! what would ye have said of the typographic *monstrosities* here exhibited, which Fashion in our age has produced ? And those who follow, as many years hence as you have preceded us, to what age or beings will they ascribe the marks here exhibited as a specimen ?

From such *whimsicalities* as these, after-times may fall into many a whimsical illusion; and it is not impossible but *unique antique typographiques* imprinted in " London's City," may be sold to the best bidder as genuine Egyptian relics of antediluvian origin, and form a choice portion of the treasures in the museums of the virtuosi ! !

With respect to the colour of printing-ink, a difference of opinion certainly exists; one kind being admired for its glaring effect, and another for its softened richness and warmth; the latter, though in fact of as deep a colour as the former, is yet so tempered as not to injure or fatigue the eye, becoming more agreeable the more it is examined. A few printers manufacture

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* See also p. 404.

TYPOGRAPHIC MONSTROSITIES!!!

VERY NEW OLD ENGLISH,
or Double Pica Black.

Modern Antique, or
Two line English of 1824.

ENGLISH ITALIAN
FOR 1824.

their own ink, or rather attempt an improvement upon that they have from the makers. Indeed, that which was formerly sold by the manufacturers possessed very few of the requisites necessary for fine printing.

Some directions may be expected for assisting the printer in producing fine specimens; but every one who has attempted improvement has some peculiarities which are not in common practice; therefore, all that can be done is, to give a slight sketch of the general method.

The **Presses** best calculated for fine, or indeed for any other kind of printing, are now the subject of competition between rival manufacturers, and will hereafter be fully treated of.

The **Paper** to be wet in such a manner as to retain its firmness, yet be sufficiently soft to apply closely to the surface of the letter, and take up all the ink. [See preceding chapter.]

The **Ink** must depend entirely upon the judgment of the printer, the liberality of the employer, and the honour of the ink-maker.—But more observations will be made relative to ink in a subsequent chapter.

The **Balls**, or **Rollers**, on which so much depend, ought to be particularly attended to. [See p. 366 and chap. followng the present].

The **Tympans** to be continued in a state of tension, by changing the blanket and the slip-sheet as they become damp.

The **Blanket** must be of fine broad-cloth, or kerseymere, and only one to be used.

When printing large letter, the surface of which requires to be well filled with ink, a sheet of tissue paper, or common paper damped, is often laid between every impression, to prevent the sheets from setting off on the back of each other.

But however laudable it may be to cultivate the art to perfection, it is to its common and more general application that we are to look for its great and beneficial effects upon the human intellect, and upon nations and societies of men. The Press is the great engine by which man is enabled to improve the faculties of his nature; it is the preserver of the knowledge and acquirements of former generations, and the great barrier, when not perverted by the hand of power, against the debasement of the human mind, and the depressing influence of despotism.

"Ages remote, by thee, VOLITION, taught,
Chain'd down in characters the winged thought;
With silent language mark'd the letter'd ground,
And gave to sight the evanescent sound.
Now, happier lot! enlightened realms possess
The learned labours of th' immortal PRESS;
Nurs'd on whose lap the births of science thrive,
And rising arts the wrecks of Time survive."

DARWIN'S *Temple of Nature.*

INKING APPARATUS.

CHAPTER V.

Apparatus for inking the Type—Lord Stanhope's attempts unsuccessful—Effected by a peculiar Composition—Forster's Composition Balls and Cylinders—Value to Printing Machines—Ingredients of the Composition—Apparatus for Melting and Casting—Directions for keeping the Balls and Rollers in good order—Effects of the Atmosphere—Applegath and Cowper's Iron Table and Apparatus—Forster's of Wood—Arding's of Iron and Wood—Mr. Parkin's.

THE late earl Stanhope, when he invented the Printing-Press which will bear his name to posterity, coupled with his object an idea of inking the forme on the press by means of a revolving cylinder; and in pursuit of this plan, spared no expense in endeavouring to find a substance with which to cover his rollers. He had the skins of every animal which he thought likely to answer the purpose, dressed by every possible process; and tried many other substances, as cloth, silk, &c. without success. The necessary seam down the whole length of the roller was the first impediment; and next the impossibility of keeping any skin or substance then known, always so soft and pliable as to receive the ink with an even coat, and communicate the same to the forme with the regularity required. All the presses of his early construction had, at each end of the table, a raised flanch, type high, for the purpose of applying his rollers; but the obstacles interposed by nature herself totally baffled and defeated his lordship's plans in this respect.

The idea entertained by lord Stanhope, and which had also been hinted at by Mr. Nicholson, of colouring or inking the forme at press by means of cylinders, is far from being new. Papillion's work on engraving, to which I have already referred, gives detailed particulars, elucidated by engravings, of rollers for inking: and although by him mentioned incidentally in his treatise on wood-cut printing, yet, if applicable to that branch of art, it is clear it might have been easily convertible to all letter-press work.

All that lord Stanhope so anxiously desired, and which even his inventive and indefatigable powers could not surmount, was at length achieved by the mere chance observation of a process in the Staffordshire potteries, in which they use what are there called dabbers. These were formed of a composition which appeared to possess every requisite for holding and distributing the ink, imparting it equally over the forme, and being easily kept clean, soft, and pliable. Mr. Forster, an ingenious printer, then in the employ of Mr. S. Hamilton, at the bookseller's printing-office, at Weybridge, was the first who applied it to letter-press printing, by spreading it, in a melted state, upon coarse canvas; and making balls, in all other respects in the usual manner. The inventors of printing *machinery* soon caught the idea, and by running the composition as a coat upon wooden cylinders, produced the apparatus so long and unsuccessfully sought by lord Stanhope, and without which, no machine-printing would ever have succeeded.

Messrs. Applegath and Cowper used it for the *rollers*, united with their table and apparatus hereafter to be described, with intent to secure it to themselves by patent. But, as no patent would hold good for a compound known long before, with the mere addition of a cylinder; and a substitute being found for their table, ink-trough, and cylinder, it was soon exposed to general use; and an apparatus equal, and by some deemed superior to theirs at fifteen guineas price, was offered to the trade for two and a half.

As this composition has now become one of the most essential requisites of a printing-office, and as many printers may be desirous of making their own balls and *rollers* (which plain name seems to have been generally adopted for the revolving cylinder), I shall take some pains to describe such proportions of the ingredients as I have found to answer best in my work, as also the apparatus required both for balls, hand-rollers, and machinery, and the process by which the whole is manufactured.

The composition (but which for shortness shall be called in future compo) consists principally of glue and molasses, or treacle. I have seen various receipts of ingredients and proportions, some possessing the recommendations which distinguish the recipes of ancient physicians; namely, a vast variety of articles with counteracting properties. But the simple prescription which my experience has proved best, is, to provide *glue* of the finest quality, made from the cuttings of parchment or vellum; fine green *molasses*, pure as from the sugar refiner, at least not adulterated for the bakers' or grocers' shops; and a small quantity of the substance called Paris-white,* and you will have every ingredient requisite for the compo. The proportions have been so variously stated, and so different from what I have found to be eligible, that I am wholly at a loss to account for such differences.

	Pounds of	
	Glue.	Molasses.
One receipt which now lies before me *in print*, says	2	1
Another, MS.	2	3
I find a mixture of	2	6 or 2 7

and about half a pound of the Paris-white, will make the compo of a superior quality to any other proportions, and will be sufficient for two demy rollers. The great disparity which appears in these receipts may perhaps be attributed to a difference in the quality of the materials, and to the mode of management. But as my wish is, to enable every one that pleases to decide by his own experience, I shall state, minutely, my apparatus and process.

First, it is necessary to procure a mould very accurately made, and well finished. Mine is made of brass, in two parts, adjusted to each other with rebates, the inside being finely turned and polished, and having flanches projecting by which the parts are screwed together by the screw and lock-burr. To each end is also fitted a collar, *c;* and a circular plate of iron, *d*, fig. 2, is accommodated with great precision to the bore of the mould, having a projection in its centre to enter a cylinder of wood about which the compo is to attach itself, and to hold it exactly in the centre of the mould, and the other end of which is kept in a corresponding position by means of a brass piece, *e*, to allow of the compo passing down between the interior surface of the mould and the wooden cylinder. The little projections on the sides of the mould, *f*, serve as feet to support each half in a steady position while lying upon a table or elsewhere, as in fig. 2 and 3. Previous to joining, the parts of the mould must be nicely cleaned and oiled; and the greatest care taken that no particle of compo, grit, or dirt, remain in the rebate. The parts being carefully placed on each other, and the wooden cylinder fixed inside, the screws must be put into their respective places in the flanches as marked, and when all is properly made tight the mould is to be set upright for receiving the stuff.

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* This is the carbonate of barytes, *terra ponderosa*, or ponderous earth; the most active of alkaline earths; and acts upon the animal economy as a violent poison. It is found in combination either with the sulphuric acid, forming the native sulphate of barytes, or heavy-spar. It is supplied from Yorkshire. It is chiefly used in adulteration of paint, giving a body almost equal to white lead. It is very difficult to be obtained pure, being often substituted with Spanish-white of the oil shops, which is nothing more than a finer kind of whitening.

Fig. 1, A, represents the mould placed ready for receiving the compo from the kettle; fig. 1, B, shows the same in section; fig. 2, shows one-half, with the mode of fixing the core, or wood cylinder; fig. 3, the corresponding half; fig. 4, sections: the reference letters applying to each figure.

Fig. 1, A

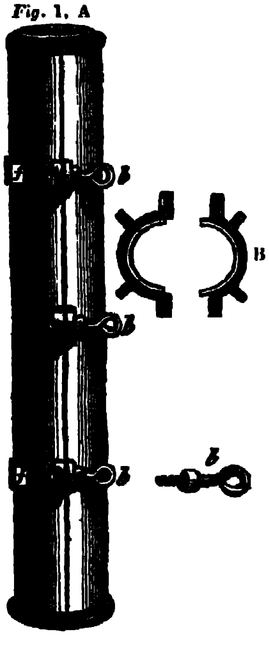


Fig. 2.

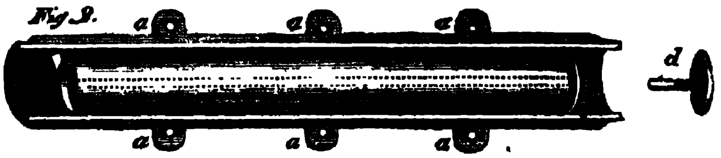


Fig. 3.

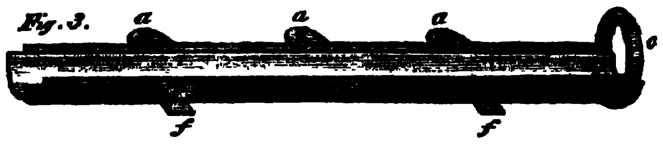
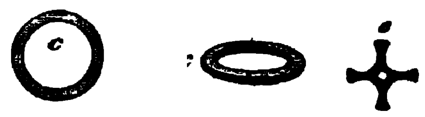
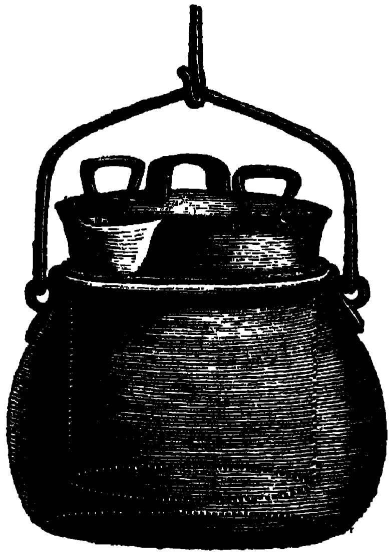


Fig. 4.



The next material part of the apparatus is the *melting kettle.* This must be a double vessel like a glue-kettle, so that the compo in the interior may be melted by the heat of the boiling water in the exterior. For this purpose a strong boiler may be the best or readiest thing found, into which let a tin vessel be fitted, with a flanch to rest on the rim, so as to leave one or two inches clear under it. This vessel may be six or eight inches above the top of the boiler, so that the lid of the one may fit the other; and it must have a large lip for pouring out the compo.



Being thus prepared, put the glue into a little water for a few hours to soak. Pour off all the liquid, and put the glue into the inner vessel, the boiler having in it as much water as it will contain when the inner vessel is in its place. Put it on the fire and boil the water as quick as you please, the heat of which will soon cause the glue to dissolve, and evaporate part of the water. When the glue is all melted (supposing 4lb.), add 14lb. of the molasses, and let them be well incorporated together for at least an hour, receiving heat from the boiling water, which is a uniform degree that cannot exceed 212°. Then with a very fine sieve, mix the white powder, frequently stirring the compo. In another hour, or less, it will be fit to pour off; and when it is, take the inner vessel out of the boiler, and pour the mixture gently into the mould through the opened brass keeper. In about an hour, if the weather be dry and favorable, you may take the roller out of the mould; hang it in a cool, dry situation, or lay it horizontally in a rack made for the purpose, and the next day it will be sufficiently hardened for use. As there will be rather more of the compo at each end of the cylinder than would work clear of the frame in which it is to revolve, cut off from each extremity about half an inch, by encircling it with a piece of fine twine.

To keep the rollers thus made in good condition for working, a place should be chosen where the air has free circulation, without being subject to the extreme heat of the sun in Summer, or the freezing damp air in Winter: in short, in as even a temperature as possible. It will be necessary to keep a stock of more rollers than are at work; as it is frequently found, when a roller is *sick*, or greasy, or soft, or you do not know what is its ailment, that washing it clean and hanging it to rest for a time, restores it to as good a state as ever.

One other circumstance must be noticed, namely, the influence of the variable temperatures of different situations on this composition. This I have had particular opportunities of knowing, from having carried on business in two distant offices. It frequently happened that when the compo was working kindly at one office, nothing could be more teazing than its progress at the other. Indeed, while I was supplied by those who make for the trade, one of my houses frequently gave them a great deal of trouble. I have heard both Forster and Harrild say, "that they were obliged to make a harder compo on purpose for my house and one or two others similarly situated, than the customary temper of the mixture:" and, frequently, the only alternative was, to find me a roller that had got hard and useless at some other house, to suit the low temperature of mine. The difference was this—one of my houses had the press-room on the ground-floor, the joists and flooring lying on the earth; the sink room adjoining; wet sheets hanging very low; very little influence from the sun; and no thorough ventilation; consequently, from the humidity of the atmosphere engendered by these circumstances, it was a constant complaint that the compo was too soft. At my other house the press-room was on the two-pair floor; the poles very high; the sun's rays had free admittance; and the ventilation was very complete. Here, the compo, complained of as too soft at the former house, was all that could be wished: hence it became the roller-nursery; and by sending them to hang up a day or two, when out of order at the other place, they became firm and fit for work.

This principle, carried to a proportionate extent, must be applied when the compo is made for, or in, other climates; and whenever the printer has to encounter these varieties of temperature, either in this country or another, he must, by a judgment founded on experiment, ascertain the proportions of the harder or softer ingredient, and regulate his mixture by the circumstances of his situation.

Notwithstanding the general use of these compo-rollers, balls will be found sometimes necessary to vary the mode of work. Cards, single cuts, light formes, &c. may require the experiment, at least, of a change. In order to make the *compo-balls,* a mould will be also required. This I have had made from a circular plate of copper nicely planished, and beaten concave so as to sink in the centre about half an inch; which is turned over a wire at the circumference, and supported to a level by three little feet. Then, as the compo is not required to be more than a quarter of an inch thick in the centre of the face of the ball, I have a board made the same diameter as the mould, and convex to a quarter of an inch, in order to give the compo a shape approaching to the convexity of the ball without too much stretching its component parts. Upon this convex board I strain a square piece of coarse canvas by turning over its corners, and fastening them with a small tack or cords. Then, the compo being made hot, and the copper mould being made warm also, I pour about half-a-pound from the kettle, taking care that none of the condensed steam drops on the mould, and pressing the canvas with a half-hundred weight, let the whole cool gradually, and it will possess a face as smooth as the planished copper, the compo growing thinner and thinner from the centre towards the circumference, which contrivance renders it more convenient for plaiting when knocked up into balls. It may be adviseable to give the inside of the canvas a coat of paint, in order to prevent the compo from pressing quite through and adhering to the wool, or hair, or lining, if any should be used; or using an inner lining of finer canvas or linen.

This compo, if it possesses every desirable quality for the purpose here described, will yet be found to draw the dirt or flue from off the face of the type, and to retain it, in spite of the *distributing* on the table, with far more tenacity than inferior stuff. It will therefore be necessary to clean and scrape the roller or ball, two, three, or four times a day, according to the foulness of the paper. This is best done by keeping some refuse ink on a spare table; and, covering the roller or ball with a thick coat, scrape the whole off with a knife.

To wash the rollers or balls made with this compo, nothing more is requisite than the application of water, in cold frosty weather a little warmed, but cold as possible in warm weather, which needs only be used with the hand. Before they are worked again after washing, an hour's drying will be necessary. Sometimes, if from the effect of bad ink they show an appearance of grease, and make friars (white spots, or white-friars), a mixture of spirits of turpentine and water will be necessary; or a little pearl-ash lie. If becoming soft by a sudden change in the atmosphere, a washing in spirits of turpentine will harden them. If by a cold or dry night they are found too hard at first getting to work in the morning, a few turns at a moderate distance from the fire, or over the flame of a burning sheet of paper will be the remedy. Sometimes they will get into such a state as to require the flame of a candle to be passed over the whole face, which must be done with the greatest care and patience.

To make the smaller rollers for jobs and galleys, you may unite, by plugs of wood, two or three together; or you may have the open keepers, with double projections to place between each when you fill the mould. They are easily divided by the cord as above directed.

If you have old compo remaining, and find it necessary to renew either balls or rollers, a small portion of the fresh material must be incorporated with it; but, as the rules already given can alone determine the proportions requisite to make the compo harder or softer, it will not be possible to lay down the precise quantities of the respective ingredients that may in such cases be proper. The molasses, or vegetable substance, will certainly evaporate and become impoverished by frequent meltings: the glue, or animal substance, will grow harder: the earthy substance will retain its quality: but a little addition of new spar will be necessary to clear and bind the whole together.

The cylinder upon which the compo is cast is made of alder-wood, turned to a diameter of two inches; so that the coat of compo which it receives is half-an-inch. The cylinder is perforated through its centre, having a brass bush, or collar, driven into each end, through which is passed an iron rod, as an axis, with an enlarged head at one end, and tapped with a screw at the other. This axis is received in corresponding holes at the angle-turned ends of the frame, and is there secured by a nut fitted to its screw-end. To the upper bar of the frame are fixed two handles of turned wood, having considerable circular projections for keeping the handles from coming in contact with the ink upon the table.

In justice to the persevering zeal and obliging disposition of the two artists to whom the profession are chiefly indebted for the success and supply of the compo balls and rollers, I cannot omit to record, more emphatically, the names of Mr. Forster and Mr. Harrild.* They had both the advantage of being printers by profession, and were consequently more capable of appreciating the necessary qualities of their manufacture. But I am afraid the competition of the two has not left to either a chance of enjoying the fair remuneration which their exertions have deserved. The charge at first for the balls, was two shillings per week, per press, exchanging and keeping them in order as often as found necessary. Upon the introduction of the rollers you either paid for one in the price of each apparatus, or table: or, if purchased separately, the price was a guinea each; and for exchanging and keeping in order, the same weekly compensation as for the balls. But the effect of the competition above alluded to, has been, to reduce this trifle to one shilling per week, and I believe even to sixpence; a very inadequate acknowledgment, considering the advantage afforded to both master and man: for the invention was at once the means of getting rid of the nauseous, filthy process in the pelt-house, and rendering a press-room as free from offensive effluvia as any other part of the office. A great annual expense was also saved in skins and wool; and a vast deal of the precious time of the men. Upon the introduction of the balls I calculated that the saving to each man was half a day in a week; and I conceive that still more is saved by the rollers. But what is above every other consideration, the quality of the work is materially improved; and the labour is reduced to comparative ease by rolling over a forme instead of beating it.

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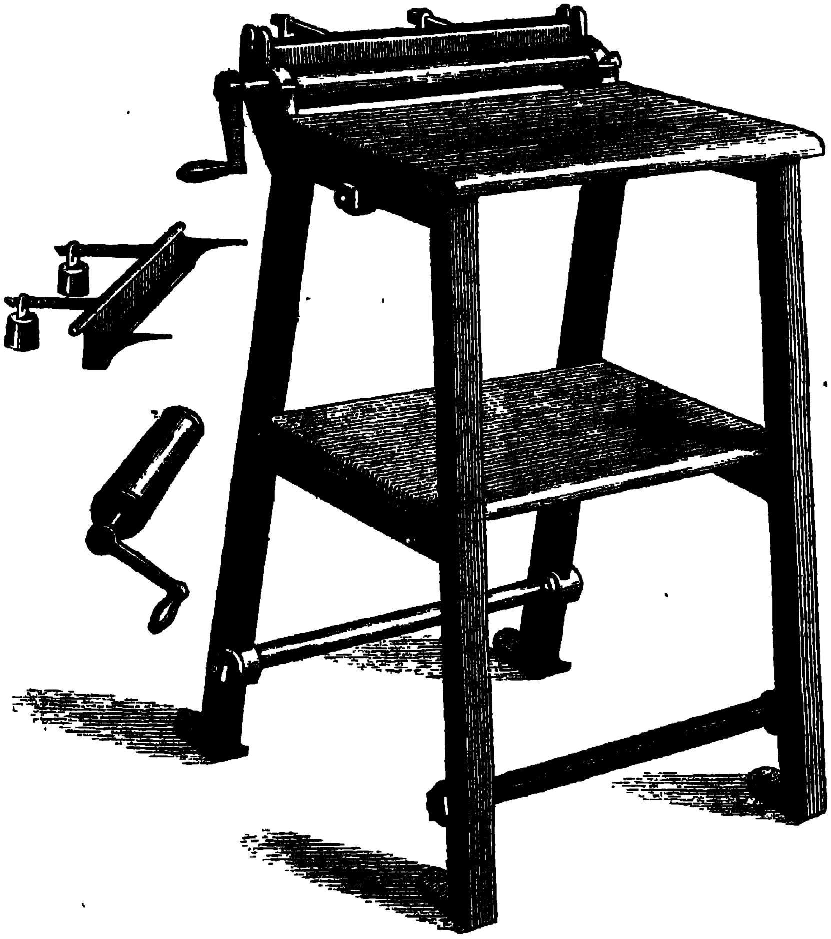
* In the history of inventions it frequently happens that two or more competitors start up to contend for the honour of being the primitive sources of a new project. In the present instance, I believe it would be very difficult to assign the palm. The best way of deciding such a point, is, perhaps, to allow the possibility of simultaneous experiments and effects.

It is curious to contemplate the various changes which have taken place in a press-room, as far as regards manual labour, within a very few years. Previous to the introduction of lord Stanhope's press, the *beating* was the lighter labour, and *pulling* the heavier; to the latter of which an apprentice was seldom put, except for very light-work, for the first twelve months. Then pulling became the lighter—the stronger beat, and the weaker pulled. But when the rollers were introduced, the stronger again took the bar, and the weaker rolled: and a well-grown lad was capable of taking both parts in the first month of his service. The pulling is now the only hard labour; the rolling requiring only a due degree of adroitness and attention to colour.

The rollers are found to answer for every description of work—for the largest or smallest type—the lightest or heaviest forme—all solid type, or all rule work—for the strongest or weakest ink—for black, or red, or any colour; and indeed, upon the whole, the introduction of the invention constitutes a new era in the art of printing.

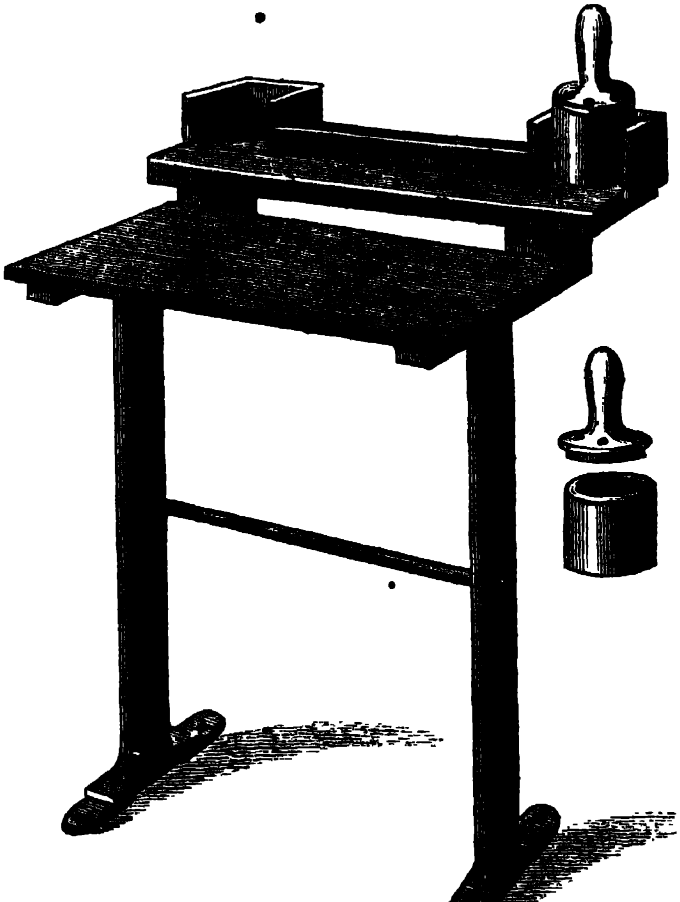
It is now necessary to describe the other parts of the apparatus connected with the inking by cylinders.

The first was that of Messrs. Applegath and Cowper, before alluded to. It consists of a trough for the ink—a cylinder to revolve in the trough—and the table to distribute upon—the whole of which is supported by a firm stand of cast-iron screwed to the floor. The frame is formed of two sides of cast-iron united by three bolts with nuts and screws. The ledges cast about the middle of the sides serve to hold a convenient shelf. The top is made with deal, which being screwed to the sides, is covered with sheet lead rendered perfectly level and smooth. To the upper back part of the sides of the frame are cast prolongations to receive the axles of the trough and cylinder. The receptacle for the ink, or trough, is formed chiefly of cast-iron; but it has a lip or edge of wrought plate-iron rivetted on the front, and ground very exact to the surface of the cylinder; and which is turned up at each end to work in grooves in the cylinder, in order to retain the ink. To the back of this trough are rivetted two pieces of iron upon a level with its pivots, which act as levers: and upon these levers are hung weights, which being placed at a greater or less distance from the trough, cause the ground edge before-mentioned to press with greater or less force against the metal cylinder, and thus regulates the quantity of ink to be taken by the roller. The ink being in the trough, and the cylinder being revolved by means of the handle, it will acquire a fine even coat of colour, The hand-roller is then applied by the workman to the ink cylinder, from which contact it receives a single line of ink, and is then rolled backwards and forwards upon the table until the ink is thoroughly spread or distributed both upon the roller and table. He then conveys his roller to the forme, and passing it once or oftener upon and over the type, it will have communicated a coat of ink, of an equal consistency and colour throughout.



The material defect in the apparatus above described is, that the ink and entire surface of the cylinder and table must remain constantly exposed, during the whole time of work, to the flue and dirt arising in the press-room, which, from the nature of paper as now made, is known to be very considerable. The scraping of the cylinder against the edge of the trough occasions it to leave all the foul particles it may have collected, as well as what the roller may communicate of that which it gathers from the forme, along with the ink in the trough, which is all drawn together by the revolving motion of the cylinder, into a cylindric form also; and appears, when the latter is put in motion, to be a second black cylinder turned by the motion of the iron one. Thus all becomes mixed together until a considerable quantity of foul matter has accumulated in the trough, and it becomes necessary to clean out all the ink remaining, which is thus spoiled and wasted.

A more simple and cheap apparatus for this purpose was immediately got up by Mr. Foster, the inventor of the composition balls.

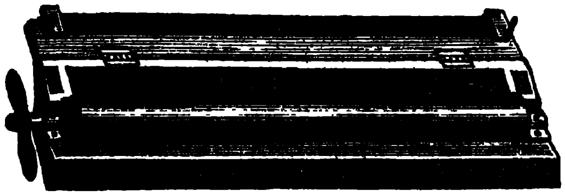


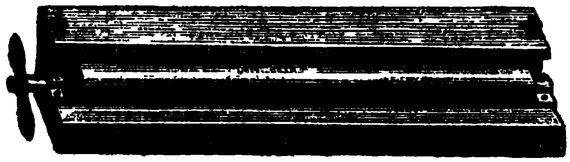
It is a stand having its two legs and feet of cast-iron; and its top, upon which the ink is distributed, instead of lead, as in the former apparatus just described, is mahogany. Behind this, elevated about two inches, is the stage for taking the ink on to the roller. At either end of the stage is a recess for receiving the contrivance which contains the ink. This is similar in shape to the brayer formerly used; but turned hollow, with the handle and top to screw on; at the bottom are holes, and when ink is wanted on the stage, the workman, taking hold of this bottle-brayer, moves it from one recess to the other, drawing it slowly along the stage. In this movement the ink, by its own gravity, will issue out from the holes at the bottom, and leave a portion on the stage, more or less, according to the rapidity or frequency of its transit.

Mr. Arding soon improved upon Foster's apparatus, by making the ink-stage of cast-iron, with circular recesses; and the whole table more of a solid form; both makers now adopt the same pattern; but the bottle-brayer has not been found to answer, as the ink soon clogs up the holes, and the wood is liable to be split by the screw at the top; and an old servant of the press-room, the common brayer, has again been found the most effective for this purpose.

I have had several of these inking tables at work, and find a decided preference due to the last described. The mahogany surface seems more congenial to the temperament of the ink and roller, than either the lead or iron. The ink is taken better, and distributes better. A line of colour is taken as perfectly from the stage as from a cylinder, since the roller, being cylindrical, can only touch the ink in a line; and it is only giving the roller a portion of a revolution on the stage to make it take a greater quantity of colour if necessary. More of the flue and dirt, inseparable from the working of paper, is held by the wood than by the lead; and consequently, the roller keeps cleaner, and the forme works better. The table is easily washed by the lye-brush, and no further waste of ink is occasioned.

This apparatus has been further improved by substituting a box and cylinder for the stage and brayer. The advantage of which will be, that the quantity of ink on the cylinder to come in contact with the roller, is regulated by a pressure at the top, out of the body of the ink, instead of at the bottom against which the ink must rest.



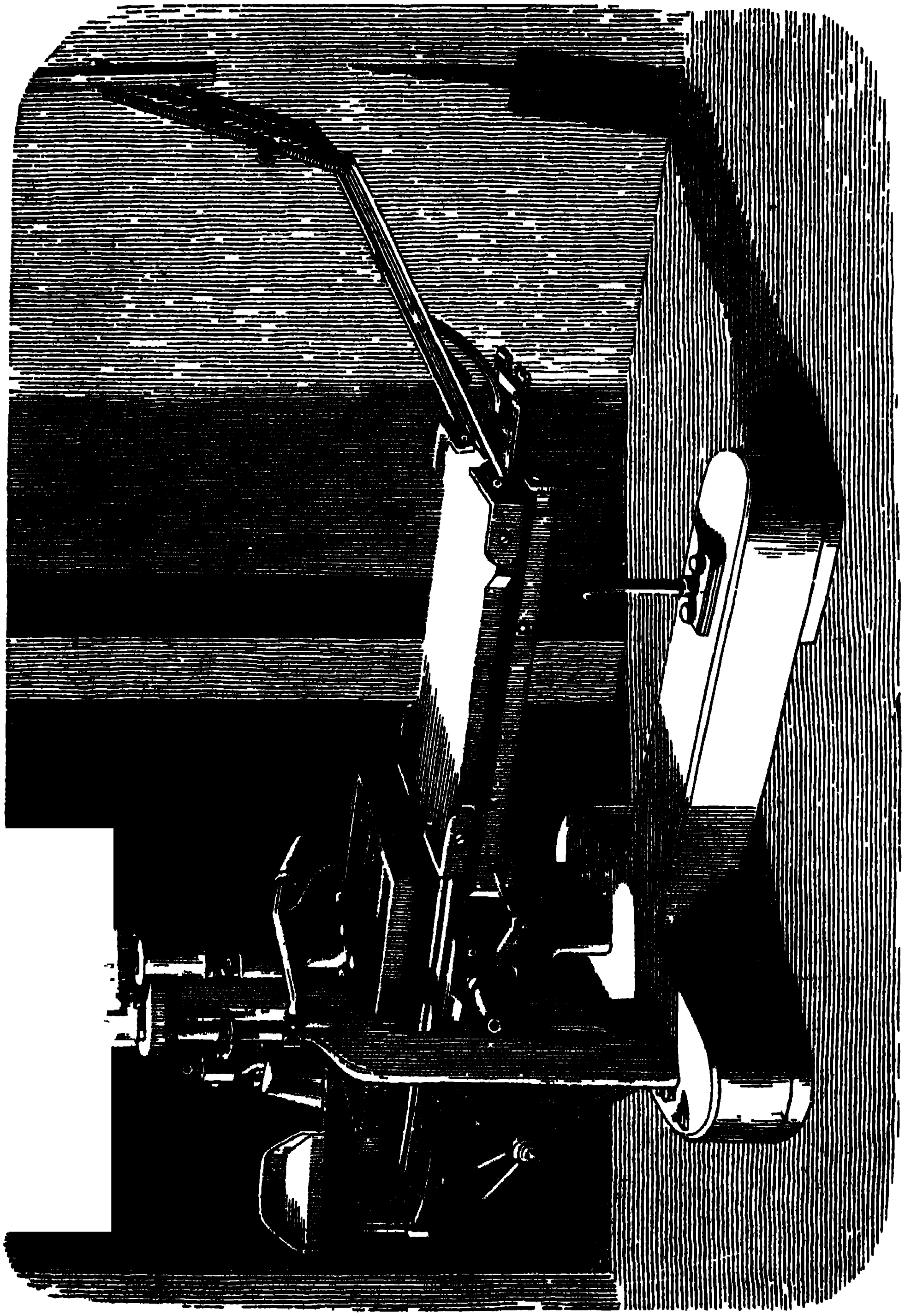


The cylinder is of mahogany, and, as here shown, moves in a box or trough which contains the ink; and which has a lid moving on hinges coming nearly over the top of the cylinder. To the under edge of this top is nailed a slip of thick butt or sole leather. This, by its naturally elastic quality, will always press upon the cylinder according as the lid is more or less tightly screwed down by the thumb-screws shewn in the drawing. This leather will also intercept in its way any filth which may arise from the depôt of ink before it can reach the cylinder: and which, when accumulated, may, by unscrewing the lid and throwing it open, as in the upper figure, be instantly scraped away with one stroke of the knife; and no further waste of the ink incurred. It will be seen from the lower figure, that no part of the ink in this apparatus is exposed; and only a very small portion of the cylinder at the time of working.

An inking apparatus for the purpose of enabling one man to perform all the operations of press-work, was invented and patented by Mr. Thomas Parkin, in the year 1820. This was contrived, by frame-work, rollers, catgut-bands, colour-boxes, &c. to perform the complex operations of taking ink, distributing, and inking the forme, with the common composition-covered cylinder. The frame was fixed on the off-side of the press, and one pressman performed the whole of the work, by stretching his left arm across his forme at the same time that he lifted up his tympans with the right, drawing the cylinder once or twice over the forme by taking hold of the handle of the moving frame; next, retiring it back again, he proceeded on to throw up the frisket, and perform the other processes of press-work.

On the fixed frame of wood, is a square frame of iron, formed to slide to and fro upon guide-rollers; a narrow plate, or table, is fixed horizontally, on a plane with the forme, and receives the ink from a small roller, called by Mr. P. the furnishing roller; this is supplied with ink from two boxes, one being fixed at each end of the table; these boxes have the sides fronting the table open, except a covering of fine wire-gauze: the furnishing roller, by the same exertion of the pressman, traverses the table at right angles to the direction in which the inking frame moves, and striking against the porous face of the ink-box, receives a portion of the colour which exudes, the equal distribution of which upon the circumference of that roller, is effected by a number of small metallic rollers, fixed in its frame, and pressing on its upper quarter arc; the roller in its traverse along the table, leaves an equal surface of ink, which is then taken up by the contrary motion of the large cylinder, and thus imparted to the forme.

This invention, however ingenious in detail, was not found to answer its intended purpose. In the first place, it required a space on the off-side of a press which the situations of press-rooms would rarely afford; and, in addition to this inconvenience, the man had not sufficient command of the main roller to make the distribution and quantity of the ink suit the work; and as a final objection, and perhaps the greatest, it must have produced in the mind of every pressman it employed the unpleasant feeling that he was turning another out of work. I think I have as much perseverance as most men in any experiment of possible advantage, but my expectations from this machine were soon relinquished.



The Printing Preſs of the Stanhope Construction.

To face page 637

IMPROVED MANUAL PRESSES.

CHAPTER VI.

Of modern invented or improved Manual Printing Presses—The STANHOPE; Descriptions and Engravings of its various Parts; application of the principle to the old Press—The Ruthven—Presses of Ridley and others—Cogger and Scott—Clymer's Columbian—Stafford—Napier—Treadwell's Treddle—Watts—Barclay—Medhurst—Stafford—Hope, of Jedburgh—Taylor and Martineau—Church—Babbage—Pouchee (for type)—Wilson—Hansard.

THE STANHOPE PRESS.

DUE respect to the disinterested spirit of the noble inventor, as well as a just estimation of the merits of the invention, requires that I should begin to treat of *modern* Manual Printing Presses with that of lord Stanhope. In a preceding chapter an ample account has been given of the principle upon which the Stanhope-press is constructed, with general references to the engravings. Here a perspective view of the press is given, and a description of the several parts will be inserted in detail.

The joiner's press requires great labour to produce an adequate impression from heavy works in small letter; it must, therefore, have been an important point to gain an accession of power, with, at the same time, a diminution of labour. This was first accomplished by the Stanhope press, which is capable of all the force of the common press, with, perhaps, a tenth of the labour.

In the formation of his iron press, earl Stanhope must have found many useful hints in *M. Anisson's Premier Mémoire sur l'Impression en Lettres, suivi de la Description d'une Nouvelle Presse exécutée pour le Service du Roi*; in which he says—" Je me suis attaché principalement à rendre son action et ses mouvemens les plus indépendans qu'il m'a été possible du maniement déréglé des ouvriers auxquels elle est confiée." This has been particularly attended to in the Stanhope press, and nothing is left to the judgment of the pressman but the colouring.

After many expensive and tedious experiments, his lordship, aided by Mr. Walker, an ingenious mechanist, succeeded in this important invention to the full extent of his highest expectations; since which, the principle has been applied to the common joiner's presses, but without any very general success.

Since its first introduction, the Stanhope-press has been made by several persons at a price considerably lower than that charged by Mr. Walker, the original manufacturer, whose price was ninety guineas for a demy-press. Messrs. Fowler, Neal, Jones, and Co. of King's Arms Iron-Works, Cupar's Bridge, Lambeth, were the first to benefit us by the competition, and have made many upon the same plan for sixty guineas, the first of which has worked several sheets of this book. This diminution of the great expense of purchase was received with much satisfaction by the trade, being calculated to do away the only objection which was likely to preclude its general use. Whether their presses were as finely finished as those from the original manufactory, is a question of but little moment; they acted sufficiently well; but both of them were, from their very construction, subject to serious injury and mischief, they were peculiarly liable to break in that part immediately on a level with the table and platten, from the curved shape of *the staple* (the cast-iron frame answering to the cheeks, head, winter, &c. of the common presses, being so denominated) which sustained all the resistance to the power of the machinery, and to repair which, incurred an expense of eighteen or twenty guineas.

As the internal construction of the press cannot be shewn in the general view of it, we proceed to a dissection of the principal parts; and, with the assistance of a separate figure for each, shall describe their construction and use, and then refer them to their respective situations in the general view.

Fig. 1.—*Bar-handle, Arbor, and Coupling-bar.*

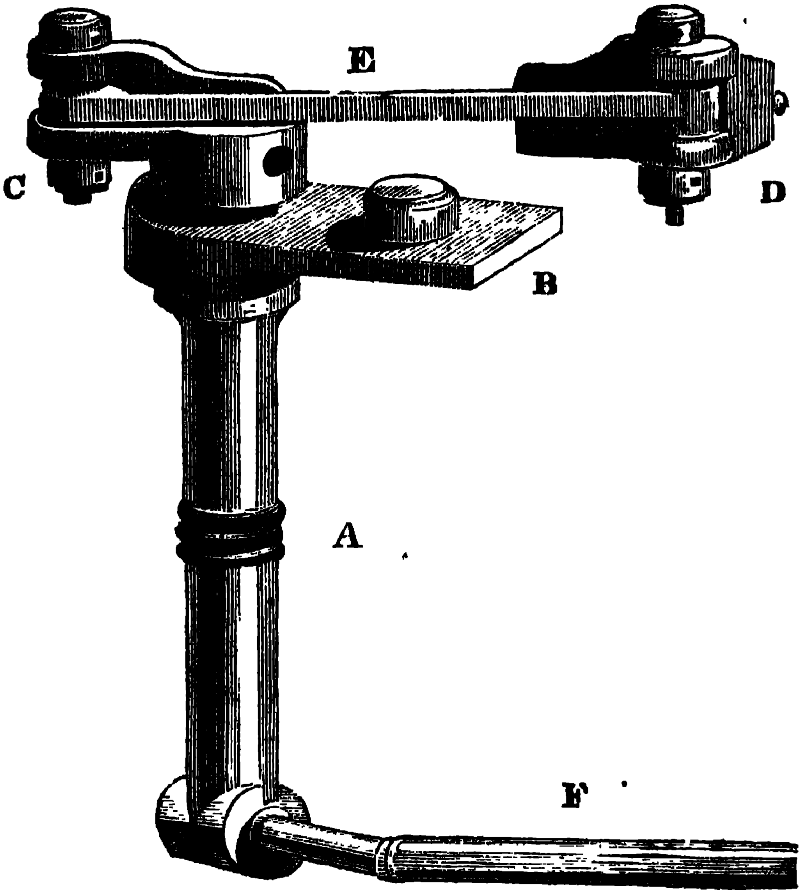


Fig. 1 shows part of the bar handle, with the apparatus by which it is connected with, and acts upon, the spindle, or screw. A is an upright pillar, or arbor, situated at the outer edge of the staple of the press, its lower end resting on a pivot, its upper being held by the top plate B, through which it passes, and receives the piece C, or arbor head; a coupling bar, E, connects this with a similar piece, D, the screw head, and in which is fitted the top of the screw. The top plate, B, is fixed to the top of the press by a screw, the head of which is seen in the figure. F shews the insertion of the bar handle in the arbor, and the figure, therefore, explains the means by which the pull operates on the screw. A material improvement for regulating or varying the power has been introduced, by elongating the hole in the coupling bar E, in the head D, and then by a screw making the coupling bar longer or shorter.

Fig. 2.—*The Screw.*

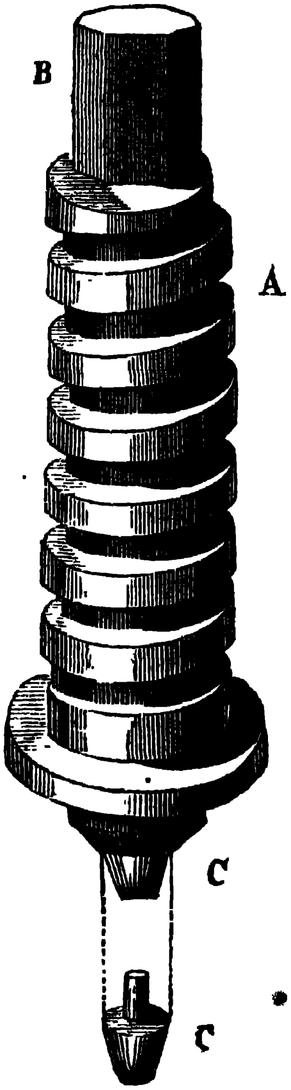


Fig. 3.—*The Nut, in Section.*

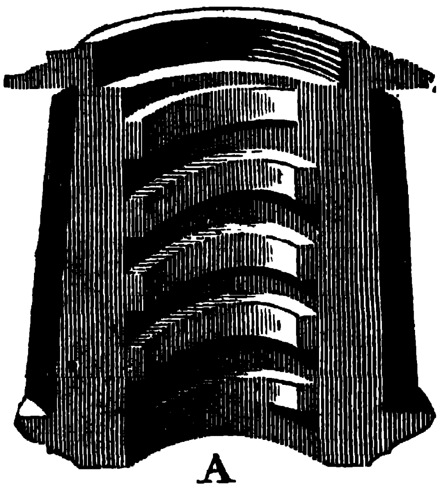


Fig. 2 is the screw, of which A is the thread. B, the top, is hexagonal, or what mechanics understand by six square, and is fitted into the screw head, Fig. 1. The piece shown at C forms, what is generally called, the toe of the spindle; it is here a centre of cast-steel, and somewhat rounded at its lower end; it is repeated in the figure, to show the pin by which it is inserted in the screw, and the shoulder formed by the pin with the lower part. This contrivance affords a ready method of adjusting the pull of the press; a thin metal collar or washer being dropped over the projecting pin on the shoulder, will evidently alter the pressure in proportion to its thickness; thus, a collar of 1-16th of an inch in thickness is found equal to one blanket, and somewhat more.

The screw works by its thread in the piece seen at fig. 3. This is called the box, which being fixed in the upper part of the press, performs the office of the head in the old press.

The screw and box made with the presses are cast-iron: and as soon as they break, which it is pretty certain they will, I have them replaced by a wrought-iron screw and bell-metal box.

The lower end of the screw passes into a hollow cup, at the bottom of which is a steel centre, with a flat face, on which the screw bears by the pin C, in fig. 2.

Fig. 4.—*The Cup and Piston.*

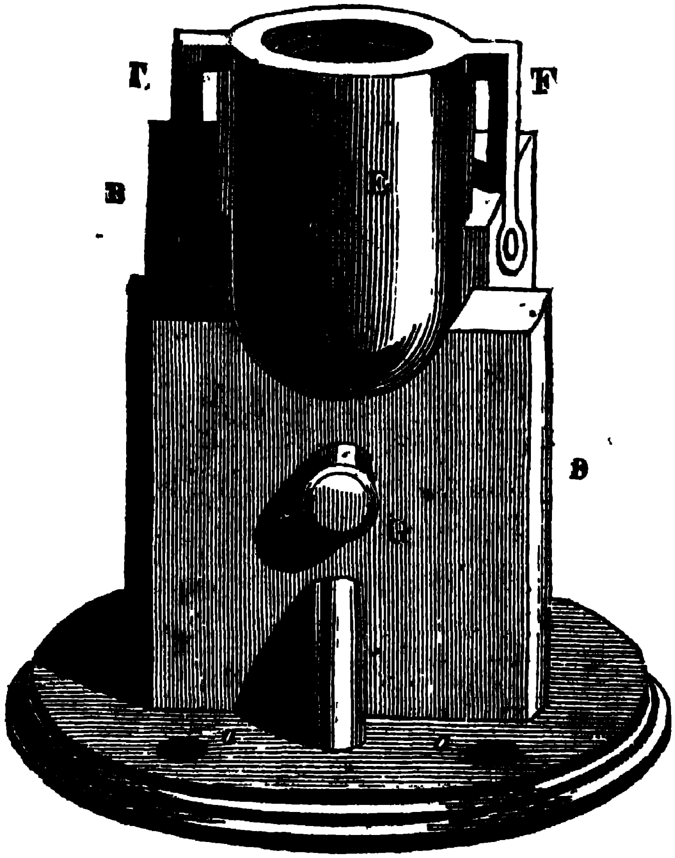


Fig. 5.—*Section of the same.*

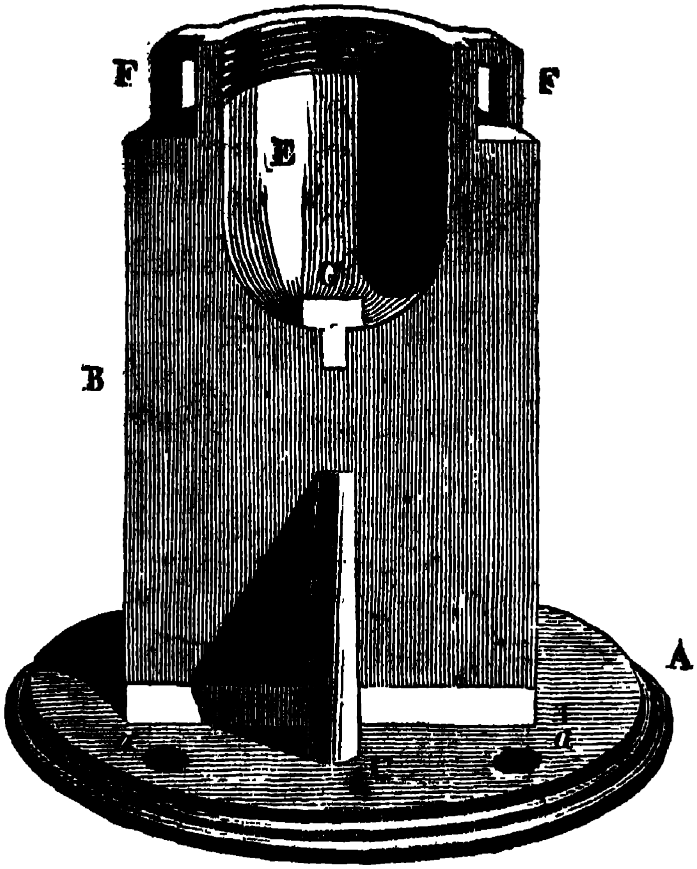
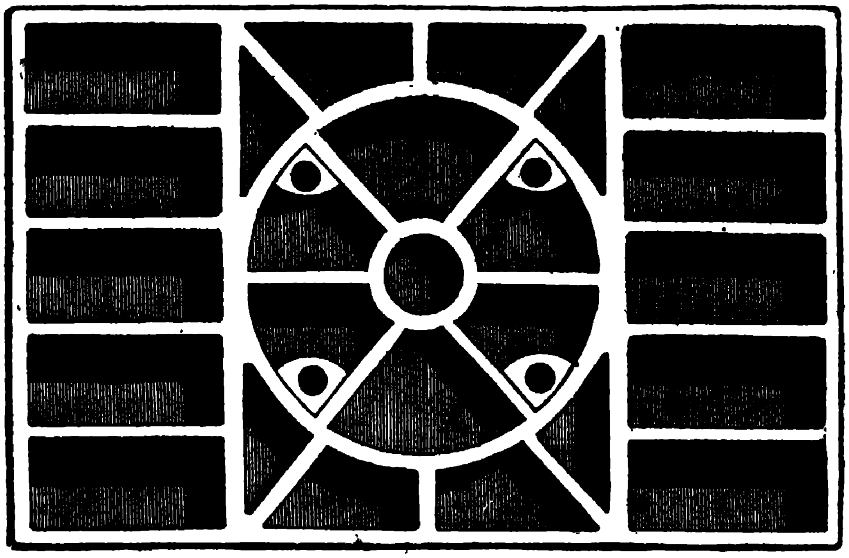


Fig. 4 shows the back side, and fig. 5 the front, with a section of the cup, showing the centre on which the screw acts. Thus E is the cup in both figures; G is the centre; F F are steel loops, for a purpose which will be hereafter explained; B is a solid piece forming the frame of the cup, by which it is placed upright on a circular plate, A A. In fig. 4 D is a back plate, held to the cup piece by the screw G. C in fig. 5, and a similar piece in fig. 4, are front views of projecting pieces called stays, for the purpose of holding the cup firmly upright.

The circular plate, A A, is fastened to the platten by four screws at the holes *a a*, seen in both figures.

Fig. 6.—*The Platten.*



The platten is entirely of cast-iron; the circle, A A, corresponds with the bottom plate, A A, in figs. 4 and 5, and the holes seen in the four corner pieces within this circle, receive the screws by which these two pieces are held together. It is cast with cells, as above represented, to give it strength to resist the power of the pressure, and at the same time to relieve it from all unnecessary weight. The face is turned to, as nearly as possible, a perfectly plane surface, by means of a lathe and tools of immense power and strength; and if the purpose in this respect shall have been fully acquired, the platten and table become proportionably valuable, as every thing that is perfect and beautiful in typography depends upon an even impression, which can only be given by an upper and under surface held perfectly parallel to each other while the force is applied.

Fig. 7.—*The Fork and Hook.*

This is an apparatus which is attached to the hinder part of the press by the ears seen at A A. The extremities of the fork are steel on their upper sides, and pass into the steel loops, F F, before spoken of in fig. 5, by which the whole is suspended. On the straight bar, B, moves a sliding piece, C, which is provided with a hook, and bears an iron weight of about ¾ cwt. This forms the counterbalance to the platten, and at the return of the bar lifts the platten from the forme. The power of this counterbalance is, of course, variable at pleasure, by altering its distance on the bar; it is held at the required point by a tightening screw, which passes through the upper side of the sliding piece.

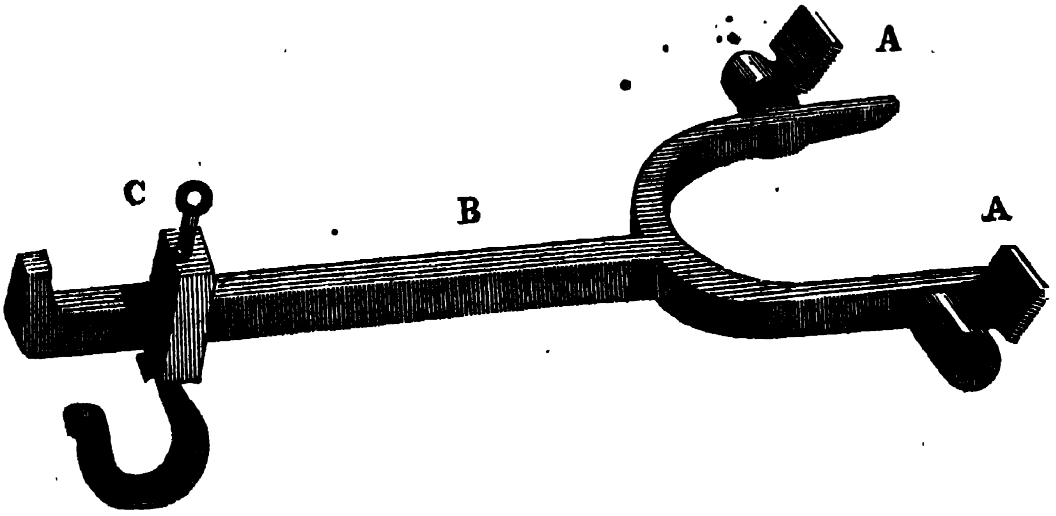
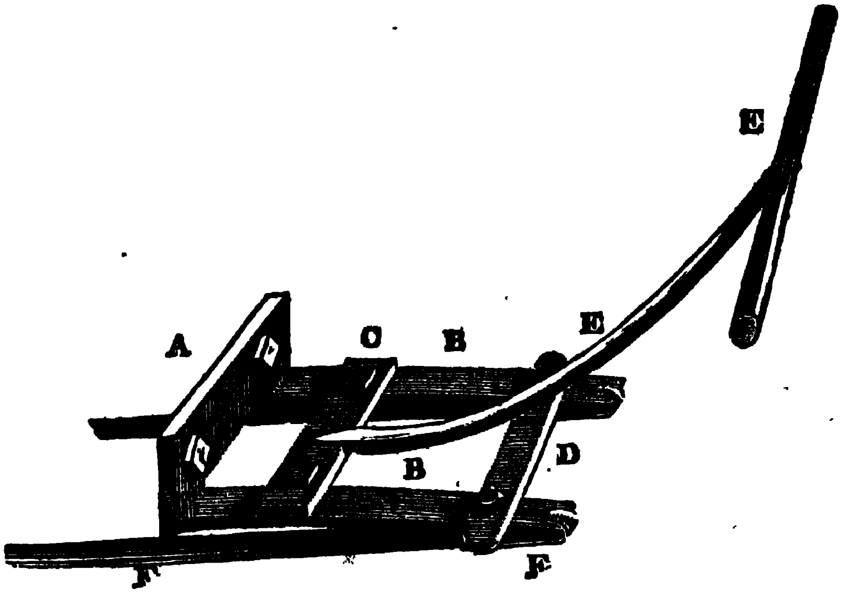


Fig. 8.—*The Gallows,*



in which the frame, A B B, is screwed to the front of the carriage, between the joints of the tympan. C, is a flat bar, which is fastened across the piece, B B, and from which proceeds the curved rod, E E, having a cross piece at its upper extremity. D, is a coupling which holds fast the ends of the straps; the straps themselves are seen at F F; they pass, as usual, beneath the carriage ribs, and round a double wheel fixed on a spit, and so to a framework somewhat similar, at the other end of the press.

The method here proposed for fixing the gallows is most inconvenient, and even dangerous. When the carriage is run in to the position for the pull, the hither end of the cross-piece E, is in the exact situation to strike the ribs or breast of the man as he throws his arm and inclines his body to catch hold of the handle of the bar or lever. I have all this taken off, and fixed to the cross-bar that unites the ends of the slides, which gives the opportunity of adding another material improvement to the press. To all presses it has been found necessary to have bolsters, as well to check the impetus in running out the carriage, as to prevent it from running in by the recoil, or from the beating; instead of which bolsters, I have a little catch fixed on the sides of the outer tympan, which, upon throwing up the tympan, catches upon this cross-piece, and, being hollowed out to its shape, instantly holds so fast that, while the tympans are up no force or beating can run in the press: but the moment the man puts the frisket and tympan in motion they become disengaged, and the effort required to start the press off the bolster is prevented.

After carefully examining the account of the separate pieces, with reference to their figures in the engravings, there can be no doubt but a mechanic, or any person accustomed to a common printing press, will easily understand the construction of this, by reference to the general view of it at the beginning of the chapter.

It will there appear that, by this improvement in the construction, the cheeks, the cap, and the winter of the old press are not required. The office of the head, in the old press, is here performed by the piece shown separately at fig. 3; that of the shelf and hose, by the figs. 4 and 5; and that the old construction of the spindle and bar handle is here improved upon by the arrangement shown in figs. 1 and 2.

The platten, at fig. 6, is, in this press, fixed to the hose, or apparatus through which the screw works; and it will also be seen that it is suspended to the short arm of a lever, provided with acounter balancing weight, by which the forme is released from the platten at the return of the bar, after the pull.

For the plank, coffin, and stone, is substituted a cast-iron plank or table, which has its upper surface made accurately flat, by the same machinery as the platten, and is laid correctly horizontal. The under surface is cast with hollow places, or cells, in the same manner, and for the same purpose as the platten, but, in addition, has two horizontal parallel projections to answer the purpose of the cramps, upon which it runs in the slides. This, with the provision made for a perpendicular pressure on the platten, and the care taken to set its lower face parallel to the surface of the table, is the only means towards ensuring an uniform pressure on the forme.

The apparatus which takes the place of the old forestay, sufficiently explains itself in the engraving.

The slides which receive the table, and answer to the carriage and ribs, will be also equally obvious.

The ink-block is here a block of the usual thickness, with a ledge of sheet iron, and is supported by a light frame-work of iron rods. The balls are held by a projecting fork.

The tympans, &c. are as usual, except that some prefer them made entirely of iron, and the whole press is firmly set and screwed on a massy block of wood, of the form and relative dimensions shown in the engraving.

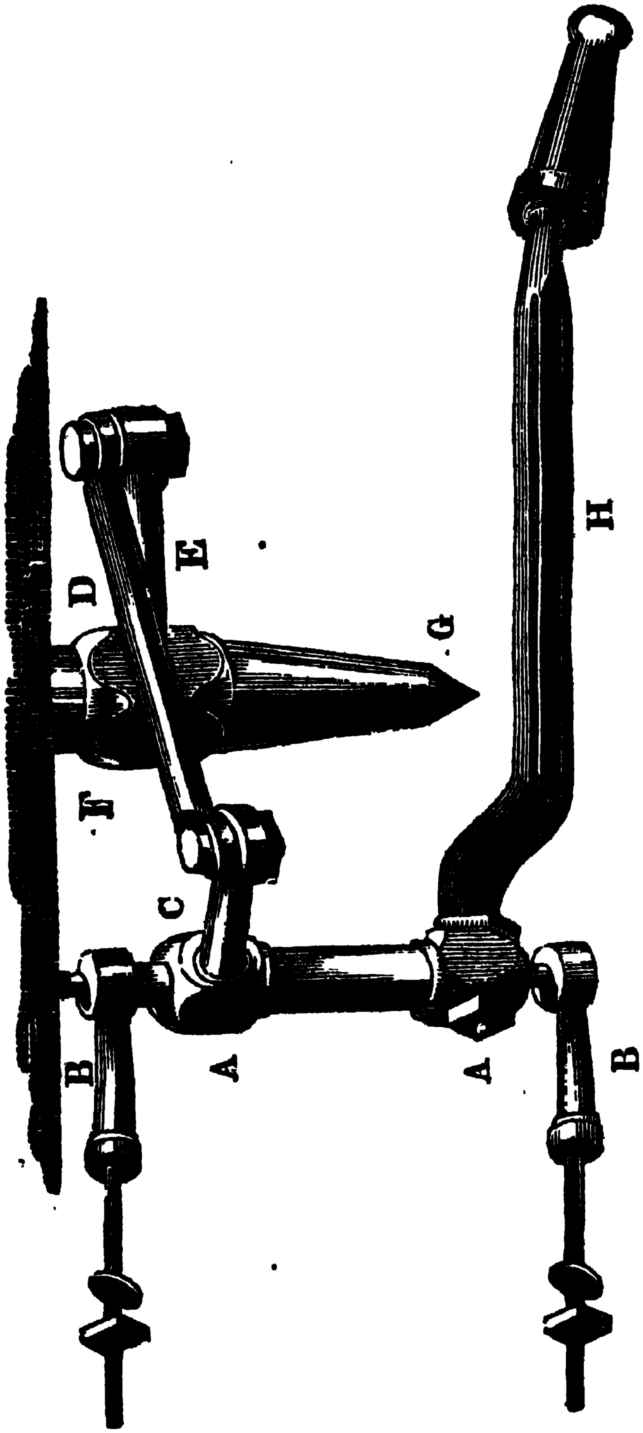
It has not been considered necessary to encumber this descriptive account of the press with the minute dimensions of the several parts. It will be sufficient to say, that in the separate figures the relative proportions of the small parts are observed; and that, in the general view of the press, the same relative proportions are observed among the pieces themselves.

The Stanhopian improvement in gaining power for the lever was applied by several of the press-makers of the metropolis to the common press; and some of the most respectable master-printers were at one time so sanguine in their expectations from this plan, that it was imagined in a few years there would not be a common press in London that had not undergone this important alteration. But experience, we believe, has now fully shown how impossible it is to construct a machine of this sort, composed principally of wood, capable of resisting the great increased power produced by the new arrangement of the bar and spindle. The head and winter, let them be fitted into the cheeks with whatever firmness, will be affected more or less by the power produced—or, in other words, the resistance above, or the firmness of the head and winter, will turn out to be more or less unequal to the intended force of the pressure applied to the forme. Where this is the case, both that sharpness and smoothness of impression produced by the Stanhope press, from formes of pearl and nonpareil letter, are here completely wanting. These presses will, however, no doubt, bring off a clear and sufficiently strong impression from light formes set in leaded long primer and upwards.

That we may convey a more correct idea of the Stanhopian improvement, thus applied to the common press, we shall here present our readers with an engraving of one constructed on this principle.

In a perspective drawing of a machine of this kind, it is impossible to show all the parts sufficiently clear to impart a perfect knowledge of its construction; we shall therefore give sketches, with the dimensions of those parts which differ from the common press, and those which are intended to produce the same effect as the Stanhope press.

Perspective enlarged of the Bar-handle and Lever



The upright pillar, A A, is 0 : 9 long, and 0 : 2 diameter.

The projecting pillars which support the upright, A A, are 6 inches long to the shoulder, and are furnished with nuts and screws fixing through the cheek of the press.

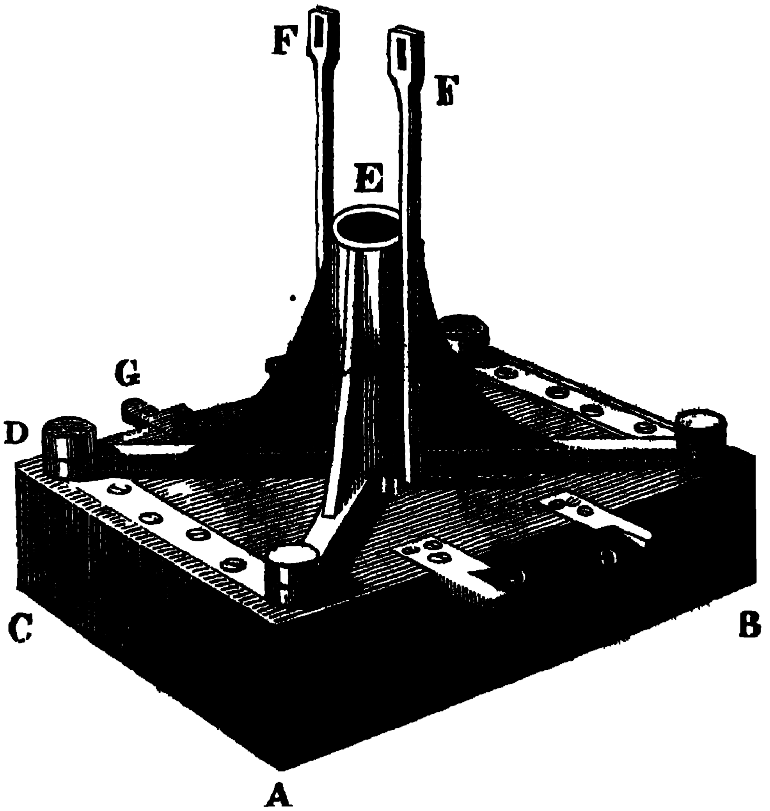
The lever, C, is 4 inches, D, 12 inches, and E, 6 inches long.

The spindle, F G, is 9 inches from the under side of the head at F, to the toe at G.

The bar-handle, H, is 2 : 2 long.

A bar extends between the press cheeks, for the support of the lever and weight.

The Platten.



The length, or A B, is 2 : 3; A C, 1 : 7; C D, 0 : 4.

Height of the cylinder, E, the top of which receives the toe of the spindle, is from E to H, 7 inches.

F F are iron rods, with an eye at the upper end of each, which receive the hooks, C C, of a lever, by which the weight of the platten is counterpoised.

G G are projecting pieces, set at a distance apart equal to the thickness of the cheeks, which, by being exactly fitted to the sides, and the inner face of the cheeks, steady the motion of the platten.

THE RUTHVEN PRESS.

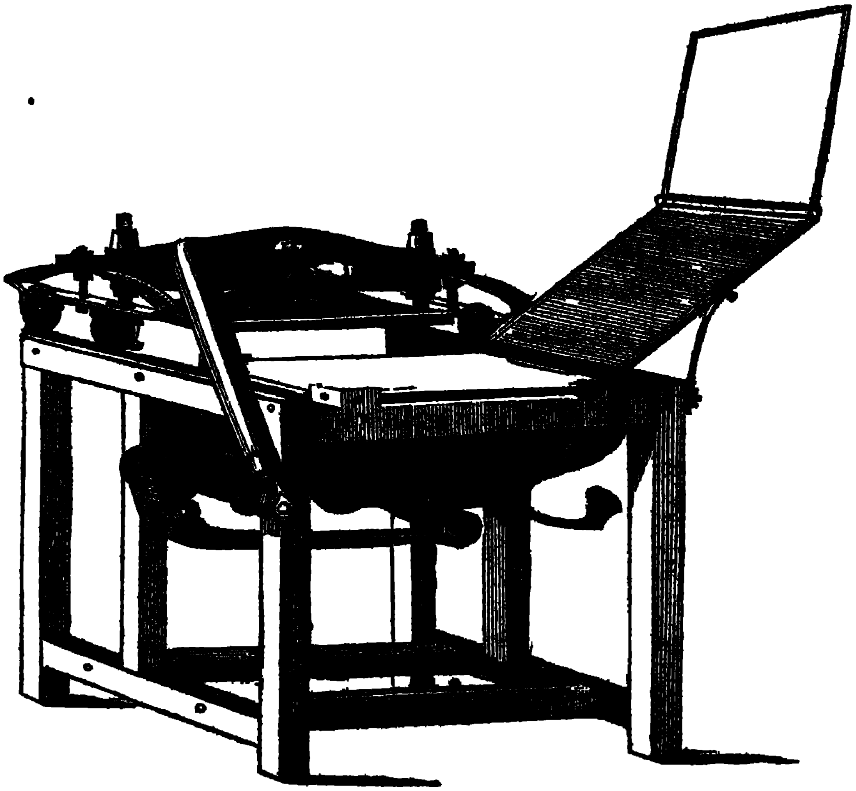
Another printing press of acknowledged merit, called, from the name of its inventor, " The Ruthven Press," has been some time in use in various offices in England, Scotland, and Ireland, Russia and America. Mr. Ruthven was a printer in Edinburgh, and, from his practical experience in what are the requisites of a good press, may be reasonably supposed very competent to devise improvements. I have not the advantage in describing this machine that I had in those previously mentioned—that of having worked with it: but I have seen them at work, have handled them, and, I believe, understand perfectly well their construction.

In the Ruthven-press the forme, instead of being situated on a running carriage, is placed upon a stationary platform, or table, which is provided with the usual apparatus of tympans, frisket, points, &c. to receive the sheet of paper, and convey it to its proper situation on the forme after it has been inked.

The platten is moveable on wheels or rollers connected with springs to bear it up while bringing over the tympans.

The machinery by which the power for the pressure is obtained, is a combination of levers, actuated by a crank or short lever, turned by a longer lever, to which the pressman applies his left hand, and the weight of his body; the other parts are situated immediately below the table, and the platten is brought over the forme, and connected at the two opposite sides or ends, with the machinery below, by which it is so forcibly pressed or drawn down upon the paper which lies over the types, as to give the impression, which being thus made, the platten is disengaged, and removed from off the types by a motion of the foot or hand.

The levers beneath the table are well contrived to have the best effect in saving time, and producing an immense pressure; for when the pressman first takes the handle, it acts with but little advantage as to power upon the levers, and therefore brings the platten down very quickly upon the tympan. The levers have then assumed positions in which they exert a more powerful action upon each other; and this action continues to increase until one of the levers and its connecting rod come nearly into a line, when the power is greatly increased, and capable of producing any requisite pressure. By this construction of a press is avoided the moving of the heavy carriage with the forme; for the platten needs be but a small portion of the weight of the loaded carriage; and further, it may be moved from off the types sideways, and therefore has a less distance to move than the carriage in the ordinary press.



The engraving (by Mr. Branston) will afford a very accurate idea of the action of this press.

Mr. Medhurst, of Denmark-street, Soho, produced a printing press of considerable merit, from its simplicity, having the same advantage, in point of power, as lord Stanhope gains by the compound levers. It is a common press in all its parts, but instead of a screw, a plain spindle is employed: on the lower part of it, just above the lever, a circular plate is fixed, and affords steps for the points of two iron rods, which extend up to the head, and are there supported by their points entering sockets. When the platten is up, these rods stand in an inclined position, although both the ends of them are at the same distance from the centre of the spindle; but when the spindle is turned by the bar, the circular plate, in which the lower points of the iron rods rest, turns round in a circle, and the upper ends remaining stationary, they of course come towards a vertical position, in which motion the spindle and platten are forced to descend, in the same manner as though a screw was employed; but this motion has every advantage of the Stanhope levers, or Mr. Roworth's press, without the friction of either, for the power increases as the resistance increases, and when the rods come nearly parallel to the spindle, or into a vertical position, the power is immensely great.

A plan for the improvement of the printing-press, by Mr. Joseph Ridley, was, in 1795, rewarded by the Society for the Encouragement of Arts, with a premium of forty guineas, the model of which may be seen in their Repository; and, in their thirteenth volume, a plate and description of the same. In this press the chief improvement was the action attached to the head, from which a screw, hitherto in use, is proposed to be taken away; and a perpendicular bar of steel, with a conical end lodged in a cup on the platten, substituted in its stead. The power is obtained by means of a spindle through each side of the press, near the bar, to which it is attached by three chains, the two outer ones serving to pull down the bar and platten, and the middle one to raise, or recover them again. To one end of this spindle is fixed a lever or handle, two feet long, which, by means of two chains, pulls down the platten with any force required. At the other end of the spindle is also another lever with a weight, acting as a fly, which weight may be fixed, by means of holes in the lever, at such a distance from the centre as may be judged necessary, according to the nature of the work to be done. No work with this press requires more than one pull.

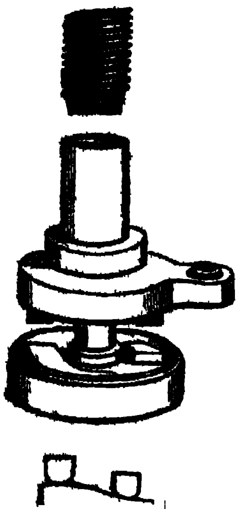
In 1796, Mr. Prosser, of St. Giles's, took out a patent "for a machine for printing of letter-press," the only novelties in which are springs or regulators above the head and below the winter, for regulating the pull, thus making bad worse, as described in p. 416.

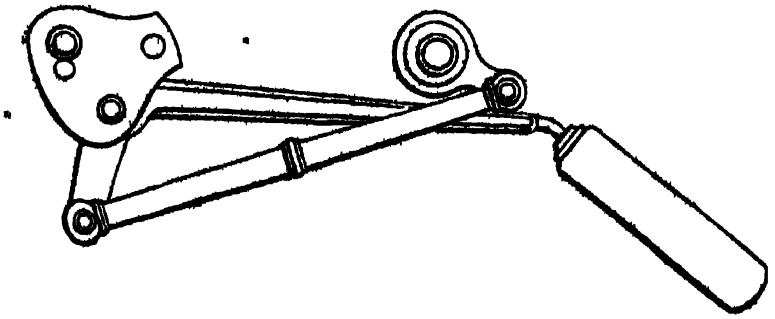
In June, 1807, Mr. Brown, a stationer, took out a patent for a press; but as it never, I believe, got into action, there is no necessity for my describing it. The curious inquirer will find a description of it in the "Repertory of Arts," Vol. xiv, second series, p. 368.

Mr. De Heine took out a patent for a letter-press, which has merged into that of Mr. Cogger.

MR. COGGER'S PRESS.

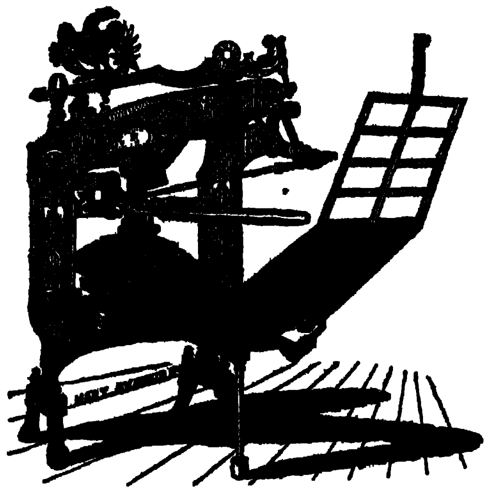
This press differs very essentially in the principle by which the power is obtained for the impression upon the forme, from the Stanhope press; and from its general form, and the arrangement of its component parts, is evidently secured from the misfortune of breaking in the main frame, as mentioned in the description of the staple of the Stanhope press. The *cheeks* (it will be best to describe these things in technical terms) of this press are pillars of wrought-iron, calculated to resist a power of above a hundred tons; they draw into the block, or stand (which is of cast-iron), from the under part, having strong rivetted heads. On these pillars are then dropped tubes of cast iron; then the bed, or *winter;* then brass tubes; then the plates upon which the levers find a fulcrum, with smaller tubes; then the *head;* all of which are ultimately held immoveable in their places by large nuts at the top. These tubes keep every part of the machine in its proper position. The cross head is calculated, from its massive strength, to afford effectual resistance to any effort possible for the power of man to give under it, and as the power is gained in the works below this head, there is no diminution of its strength by the working of the main power within its substance, as in the head of the Stanhope press. The only perforations are, 1st, for a screw to regulate the force of the under works, against which they act as a pivot; and 2nd, two small piston rods attached to the platten below, and spiral springs above to counteract the weight of the platten. The power is acquired by the multiplied cross-arm lever, drawing about one quarter round a collar, into which are fitted two studs of case-hardened iron with convex faces, which, when put in motion by the lever, move up inclined planes of unequal degree of inclination, so that when the platten is first put into the descending motion towards the forme, and power is less requisite than velocity, the latter is very rapid; but as the platten arrives towards the point of pressure, the velocity is diminished to increase the power, till arriving nearly on a plane, the power is almost infinite, and stationary till the bar is suffered to return. These inclined planes are fixed by dove-tail mortises in a brass turned box resting on the centre of the platten; this box contains the oil into which the upper studs dip on every return. The following engravings will clearly show the whole of this arrangement.





The [redacted] will show the appearance of Mr. Cogger's press to be that of strength and elegance united. I have worked them for some years, even to the extent of power required for printing double demy, and have never found the slightest repair necessary; if the power should lessen through the wear of the sectors, or inclined planes, and the studs, it can be in[illegible] gained by the regulating screw in the head, and if, a[illegible] worn completely down, or broken, new ones can be [illegible] dovetail-mortises in a very short space of time: the mo[illegible] peculiarity in this press yet remains to be noticed in [illegible] regulating the power—*it can in no ways affect the dist[illegible] platten from the tympans,* whether regulated for a light [illegible] pull, *the distance of the two parallel surfaces is alway[illegible]*; the turning of the regulating screw in the head force[illegible] lower down into the cup, and, consequently, in travell[illegible] inclined planes, they must force the platten lower do[illegible] the forme, and the contrary for a light pull. These [illegible] are made with projections from the tympan, which, stopp[illegible] the ends of the table when it is thrown up, supply th[illegible] of the gallows: on the off-side is fixed a weight which [illegible] a counterbalance to the weight of the tympans.

THE COLUMBIAN PRESS.



The press thus called was brought over to this country in 1818, by Mr. **George Clymer**, of Philadelphia, and made the subject of a patent. If the merits of a [redacted]ciated wholly by its ornamental appearance, certainly no other press could enter into competition with "The Columbian." No British-made machinery was ever so lavishly embellished. We have a somewhat highly-sounding title to begin with; and then, which way soever our eyes are turned, from head to foot, or foot to head, some extraordinary features present themselves—on each pillar of the staple a caduceus of the universal messenger, Hermes—alligators, and other draconic serpents, emblematize, on the levers, the power of wisdom—then, for *the balance of power* (we rude barbarians of the old world make mere cast-iron *lumps* serve to inforce our notions of the *balance of power)* we see, surmounting the Columbian press, the American eagle with extended wings, and grasping in his talons Jove's thunderbolts, combined with the olive-branch of Peace, and cornucopia of Plenty, all handsomely bronzed and gilt, *resisting and bearing down* ALL OTHER POWER!

To be serious:—the testimonials published in favour of this press are certainly of the most respectable character, and the private information which has been given me by clever workmen, who, after all, are, not unfrequently, better judges than their masters in these matters, impresses upon my mind very favourable ideas of its capability to produce fine and good work; in fact, the only objection I ever heard made to the press was, the long stretch required to be made by the workman to reach the bar-handle, but I have just seen one making with an improvement to obviate this difficulty, namely, the bar being fixed to the near instead of the off-side.

Whether it be entirely original, as to principle, is a matter now to be considered. Some years ago a Mr. Moore invented and took out a patent for a press, the power of which was gained by the fulcrum and lever, instead of the inclined plane or screw. I had one on a small scale (foolscap size) which was made by Mr. Arding for the late Mr. Rickaby some years after the expiration of Mr. Moore's patent, the power of which was gained by a wheel and chain, worked by the left hand, which drew down a strong lever projecting through the cheek of the press, having its fulcrum moveable (the pivot being fixed) upon the centre of the platten. The Columbian press I conceive to be upon the same principle; the lever being brought down upon the fulcrum (the platten) by a com[illegible]the right hand, instead of being brought down by the wheel and chain, equally a combined action of levers worked with the left hand.

Mr. Stafford, of Bingham, in Nottinghamshire, who is by profession a printer, stereotype-founder, common wood-press maker, Stanhope iron-press manufacturer, printer's smith, joiner, and furnisher in general (a very typographic Caleb Quotum), has invented and brought into use, for the supply of the trade, &c. in a very novel form, a portable iron printing-press, but chiefly confined to sizes not exceeding foolscap. The table for the forme in this press, as in the Ruthven and Treadwell, remains stationary. The tympans and platten are attached to each other; and when turned down, are acted upon by a lever, a screw, and hand-lever, to gain the requisite pressure. The contrivance is altogether very ingenious.*

It is not likely that presses of this construction will be made for any larger size than foolscap, on account of the great weight of the iron platten, which has to be turned up and down upon the same joints, and along with the tympans. The labour is, in some degree, counteracted by balance-weights, which are to be seen represented in the drawing; but the weight of the machine itself is necessarily thus increased: and if the tympans and platten chance to be thrown up quickly, a concussion will be produced such as would endanger the floors of many places used as printing-offices.

There is a rival claimant of this invention in Mr. Hope, of Jedburgh.—See *post*, p. 664.

* A representation of this press will be found on the leaf along with Mr. Rutt's machine.

A press to work by the labour of one man, with an apparatus to distribute ink on a roller of the elastic composition before described, and to cause that to ink the forme, all put in motion by the same power that impelled the action of the table and forme, was invented by Mr. Napier, two of which have been used by Messrs. Dean and Mundy. It was offered to the notice of the profession by a circular, in which it was announced that "one man at this press would be more than equal to two at the common press; and as enabling printers in general to cope with larger machines." Its merits were submitted to the consideration of the Society of Arts, and referred, in course, to their committee of mechanics; but the examination of the press at work, and evidence given before this committee, by no means substantiated the assertions of the circular.

To effect its object, it was first necessary to do away with the frisket. In the next place, by the situation of the inking apparatus, the getting the forme on to the table was liable, in many cases, to serious accidents. It must be held in a horizontal position, and thus slid from the hind part underneath the tympans and machinery. The correction of revises, batters, cleaning of picks, unlocking to adjust the furniture, make register, &c. would, by the situation of the machinery, be rendered almost impossible, without taking the forme off the press. The time lost in making ready would be a serious evil, from two to two hours and a half being required upon every change of forme, from one description to another, as from 8vo to 12mo, &c.; for the composition on the inking roller required to be cut into compartments so as to be stripped off the cylinder to answer to the vacancies occasioned by the furniture, or any other part which was *not* to receive the colour; or, in other words, that no part of the composition was to remain upon the wood but what would exactly correspond with the line of the pages, lengthways. Thus every description of work, or of forme, must have a roller cut to suit it, the changing, cutting, and adjusting of which must occupy considerable time; and, with the least variety of business, eighteen or twenty cut rollers must be kept constantly ready. This alone would increase the expense of this necessary article tenfold. Another serious objection was, the difficulty of applying bearers, &c. from its being deficient of a frisket. Thus it was acknowledged that no open kind of work could be done by this machine to bear the character of fine work, overlays being the only means of adjustment, which would not prevent the unequal colour arising from various degrees of pressure.

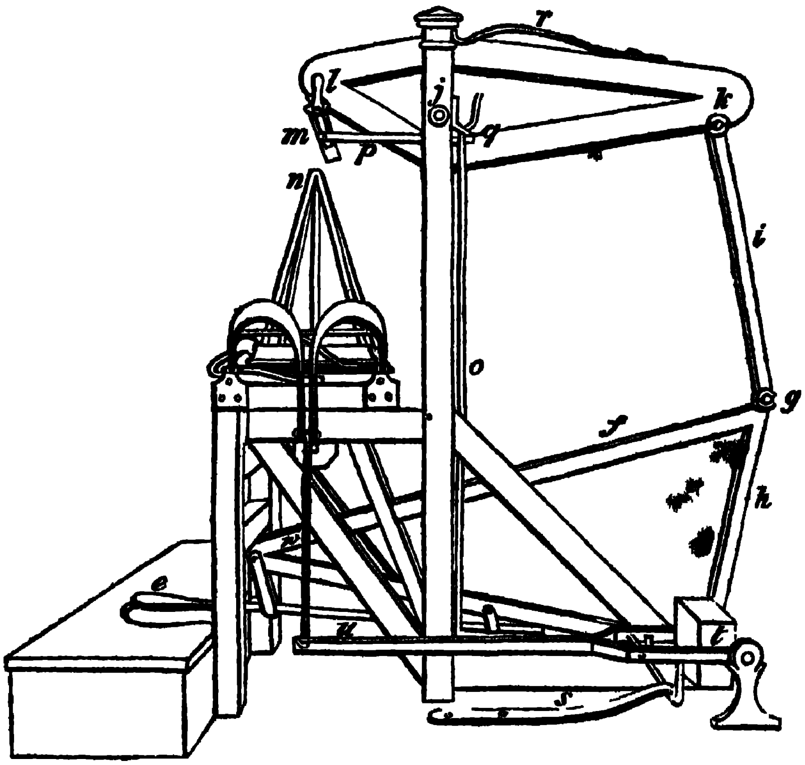
The table for carrying the forme ran upon friction-rollers in a frame, which also had a separate motion in the ribs, or slides. The mode of giving the pressure was by the inclined plane.

TREADWELL'S PRESS.

Mr. Daniel Treadwell, of the United States of America, came to England in 1820, and took out a patent for certain improvements in the construction of printing presses, which were manufactured by Mr. Napier. In this press, the power necessary for giving the impression is obtained by means of a lever, or treaddle,* worked by the foot, instead of horizontal levers, as applied to that purpose in the Stanhope and other printing presses. The table also in this press is fixed, as in the Ruthven, instead of sliding under the platten as usual, and the platten with the tympan and frisket turns over on the forme. There is besides a mode of reversing the frisket, which is made double (applicable to half-sheet work) so that the sheet may be printed on both sides without shifting.

As there is really some novelty in this press, I shall give engravings here to elucidate the description.

Fig. 1.



Query, Did the name induce the invention, or the invention the name?

Fig. 2.

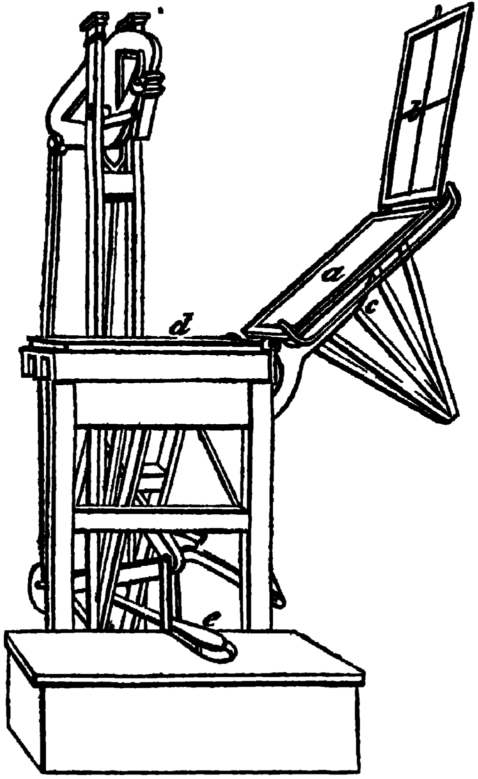


Fig. 3.

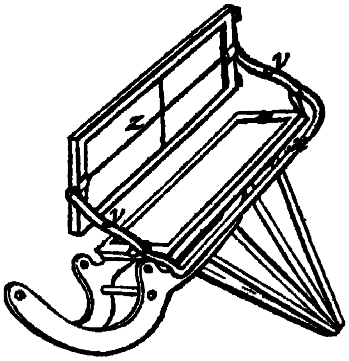


Fig. 1 represents a side view, with the tympan and frisket folded upon the platten, and the platten turned down upon the forme. Fig. 2 represents a front view, with the platten turned up off the forme, and the tympan and frisket open. The action of the press is as follows:

Having placed the sheet of paper to be printed upon the tympan, *a,* fold down the frisket, *b,* upon it as usual, and then turn over the platten, *c,* down upon the forme, *d,* as seen in fig. 1. To obtain the pressure, the workman then steps upon the treaddle, *e,* which brings down the bar, *f,* and by means of the knee-joint, *g,* the arms, *h* and *i,* become straightened, and, consequently, the main lever swinging upon the pivot, *j,* is raised at the hinder part, *k,* and depressed at the front part, *l.*

Thus the descent of the lever at *l,* by the means above described, throws a great weight upon the platten, for the purpose of imprinting the sheet of paper previously (as above) placed between it and the forme of types, *d,* which is upon the table.

By the descent of the treaddle the instant before the impression is given, another action is also obtained for the purpose of bringing the hammer, *m,* into a perpendicular direction, in order to meet the block, *n*, where the legs of the platten all unite. The rod, *o*, attached at the bottom to the treaddle, *e*, communicates also near its top by a connecting bar, *p*, with the hammer, *m*. The top of the rod, *o*, is bent, and as it slides down through a guide, *q*, by the descent of the treaddle, the connecting bar, *p*, moves the hammer, *m*, from its inclined pendent position into a perpendicular, ready to press directly upon the block, *n*, of the platten.

When the foot of the workman is removed from the treaddle, *e*, it rises by the re-action of the compressed parts, aided by a spring, *r*; at the same time the hammer, *m*, shifts from the block, *n*, in order to allow the platten to rise, and the type to be inked afresh.

The platten and its arms being of considerable weight, a counterpoise, as it turns over, is effected by the spring, *s*, and weight, *t*, acting upon the frame, or lever, *u*, which by the rod, *w*, hanging upon the bent arms of the platten, balance its weight, and render its motion easy to the workman.

Fig. 3 represents the platten, tympan, and frisket, detached from the press, for the purpose of exhibiting their parts and actions more distinctly, as respects the method of reversing the sheet, without removing it from between the double frisket; *c* is the platten, upon the sides of which are two pivots; *x*, is a bar connected to two arms, *y y*, in which the double frisket is enabled to turn over upon centres; when the sheet is printed on one side, and the platten thrown open, the bar, *x*, is depressed by the right-hand, which raises the double frisket holding the sheet of paper, *z*; the left hand then instantly turns it over, and the sheet is, by another impression, perfected.

There is certainly great originality in the construction of this press: its operations are conducted with much facility by one man; and as the rolling of the table, and the horizontal movement of the bar, are dispensed with, the labour must be considerably reduced. The chief objection which struck me, on a view of it, was the room required behind the press, four or five feet more in width than any other press. This in the confined space, and value of house-room in London, would, in itself, be a sufficient objection where no greater advantages were to be obtained than even the inventor promises. I believe only one press of this construction has been made in England.

MR. RICHARD WATTS, in 1820, took out a patent for improvements in inking printing types with rollers, and in placing and conveying the paper; and giving the pressure by a cylinder.

This press is without any apparatus immediately answering to our tympans. The frisket is a frame or carriage which runs horizontally upon slides upon each side of the machine. To this carriage is attached two inking rollers, which traverse over the forme as the frisket is run in and out. When run in, one of these rollers comes in contact with the feeding roller, which lies at the other, or right-hand end of the machine. This roller, which is entirely of wood, receives the ink from an elastic roller, which is supplied by a metal roller revolving against the ink-trough. As it runs out, the two rollers first mentioned pass over the forme, and ink it ready for the next succeeding sheet. The pressure given is by a cylinder covered with a blanket and linen cloth tightly laced. The amount of impression appears to depend wholly upon the weight of the cylinder, since provision is made for increasing or diminishing the same by means of introducing or withdrawing blocks of metal, &c. The sheet of paper is placed upon the frame, say the frisket; and the carriage pushed forward horizontally over the forme, the paper being as yet prevented from touching the forme by slight springs which raise the frisket an inch above the table. A winch is now to be turned by the workman, which puts in motion an axle and band-wheels, and several guide-pulleys are passed by two endless bands, by which means the pressure cylinder is brought forward, and rolled over the paper and forme; and then, by a reversed motion of the winch, is returned to its place. The carriage with the frisket is now to be withdrawn, and the printed sheet removed, by which motion the inking rollers have been again made to pass over the forme, and to ink it ready for the next impression. As it is necessary that the rollers should continually receive fresh supplies of ink, this is effected by the following means, at the time that the impression-cylinder is passing over the types. A bevil-geer at the end of the axis which carries the band-wheels for the cylinder, causes the metal roller and the wooden roller to turn, by means of which the ink is distributed over the surface of the inking rollers, which are at the same time resting upon the feeding roller. But as the metal roller must always revolve the same way, it is necessary that the bevil-geer should be changed when the axle and pressing cylinder are turned back again. This is effected by means of a forked lever, which causes the socket with the bevil wheels to slide along the axle, and thus brings the wheels alternately into geer, according to the direction in which the pressing cylinder is at that time moving.

For further description, and an engraving of Mr. Watts's press, I must refer my readers to the Lond. Journ. of Arts and Sciences, No. 10, p. 263, &c. and plate xii.

In 1822, Mr. Barclay, of Old Broad-street, took out a patent, "from a communication made to him by a certain foreigner residing abroad," for the invention of a Spiral Lever, or Rotatory Standard Press. This *invention* will be likely to prove to Mr. Barclay that it would be far better to study the inventions of our own country, than to place implicit reliance upon the pretensions of foreigners. What he calls the spiral levers, which draw up the platten, have been applied with far greater simplicity of connecting apparatus, than that which his patent press seems to have the benefit of, for some years past to Mr. Cogger's press, described in p. 654. As to the rollers, and the wedge, and the inclined planes, made to act by a compound horizontal lever, the same principle has been long applied by the makers just referred to, and also by Mr. Napier, in a far superior manner to that which he has adopted. Any printer, however, wishing to study this important foreign communication, will find it fully detailed, with a very clear engraving, in the Journal before named, for April 1822.

Mr. Hope, of Jedburgh, in Scotland, has a recent patent for an improvement to increase the power of a press, which appears to be rather an extension of the connecting-lever system of the Stanhope and Cogger presses, than an entire novelty. The irregular inclined plane is precisely upon Cogger's principle, and although drawn and described in Mr. Hope's specification, and made an essential part in the formation of his press, is yet disclaimed as his invention. The immediate object of his invention, or improvement, is to bring the mechanical power, or multiplied lever, of the presses above named, twice into action, where theirs is only once employed; this is effected by an additional forked lever, attached to the off-side of the iron standard, and another connecting rod, leading round the back of the press to the inclined planes; this would appear to give an increase of power of nearly a double ratio. The inclined planes (or as called in the Cogger press, the sectors), by the counter-action of which, against each other, the space between the fixed head of the press, and the moving platten becomes increased, and thus causing the pressure, are, in this Jedburgh press, of cast iron, from a rather complicated pattern; and thus, if any part was to yield, or break, the repair would be expensive and troublesome for want of the patterns to cast from; in Cogger's press the inclined planes are separate pieces of steel, or case-hardened iron, let into the head and cup, which bear and carry them, by a groove, so that in case of wear or accident they are easily replaced, without any derangement of the surrounding parts.

Messrs. Beilby and Knotts, of Birmingham, are the agents, in England, for the sale of this press. I do not know whether their agency has ever been effective in London, so I have no means, at this moment, of giving an opinion upon its merits in a printing-office: from its appearance in regard to finish of workmanship, in comparison with any of those I have before mentioned, or seen, I should have but little expectation of superiority of press-work; and as to increase of power, we have quite power and ease enough in our other presses to answer every purpose of printing. For further description and engraving, see Lond. Jour. of Arts & Sciences Aug. 1823. Mr. Hope also claims the invention of a small press similar to that described as Mr. Stafford's (see p. 657). Which has a right to the merit, I am unable to decide; but Mr. Stafford's was certainly the first which came to my knowledge.

The Printing Machines, and other Inventions relative to Printing, of Doctor WILLIAM CHURCH.

AMONG the many inventions which have been produced within the last twenty years for facility of printing, I have had great difficulty in assigning to each a degree of notice in some respect regulated by what I conceive their relative importance to the profession; but the inventions of doctor (and engineer) Church, are so gigantic in their pretensions, that to give any idea of their intended operations must occupy a space rather according with their extended nature than my conviction of their efficacy.

The London Journal of Arts and Sciences notices the "extraordinary association of mechanism, which embraces a more extensive range of invention than we remember ever to have seen before projected by any one individual, and combined under one patent." I cannot, however, agree with them in placing it, "not among the merely *curious* productions of art, but in the front rank of those valuable and useful inventions which adorn the present age."

The first series of Dr. Church's press inventions was known here in 1821. This promised nothing more than what might easily be believed as possible, with the usual abatement from the promises of new inventions: and has been found to answer in proportion. The impression is gained in a method differing from any of those hitherto described, by preserving the vertical movement of the horizontal plane, or platten, of the old, and Stanhopian presses, and having occasion for the regular well-skilled pressman. I shall extract a description from the Journal before mentioned, omitting the references to the plate, which will be found in vol. iii, p. 57, and plate iv. It may be as well, however, previously to state, that the object of this press, as to the saving of labour, is that one pressman alone shall perform the whole; he has only to lay the sheet on the tympan, and immediately apply his hand to the rounce, by the turning of which the forme is inked, the frisket and tympan turned down, the press run in, and the impression given: a reverse of motion reverses the process, and prepares for the next sheet. This press certainly turns out very excellent work, at somewhat less expense than a Stanhope, or other press, but in its first cost is about double; and I do not find it possible to execute more than one fourth or, at most, one third more than those other presses worked by a man and a boy; consequently, no expedition is acquired without an additional number of machines, involving both capital and room; two matters equally serious in a London printing-office.

This invention consists of three parts: first, in the mode of obtaining the pressure; second, in a particular arrangement of the inking apparatus; third, in a mode of raising and lowering the frisket, and by the same operation, of removing the paper after printing.

The rounce is turned by means of a winch upon its axle; a bar of steel is connected by a hinge-joint to the bottom of the table. At the reverse end of this bar is a foot, or projection, to which the chain is attached, and passed round nearly the whole periphery of the rounce, and there secured; another chain, cord, or band, is fastened to the rounce at one end, and to the hinder part of the table at the other, by means of a rod passing through the back plate, where a worm-spring is applied for the purpose of relieving the strain of the chain or cord. Supposing the machine in the position of having just given the impression, in order to raise the platten from the table, the winch must be turned backwards, by which the foot of the bar (in contact with the periphery of the rounce) will be raised; and as the winch continues turning, the chain or cord in winding round the rounce will draw the table forward, at the same time the bar will pass over the rounce. As the table begins to advance, the platten (connected to it at the hinge-joint) is moved also, and this movement raises the platten in the following manner:

The pressing lever turns upon pivots in the heads of the pillars: this lever is connected to the platten, by means of a hinge-joint; so that as the platten, by the advance of the table, is pushed forward, the lower end of the lever raises it, and by swinging upon joints, is, when the table has arrived at the front of the standard, thrown up in an inclined position. The paper is at this time laid between the tympan and the frisket, when, by turning the winch forward (that is, in a contrary direction to the last described) the chain draws back the bar, which causes the table to return to its situation, as first mentioned; the platten, at the same time, being turned over by means of its connection to the table at the hinge-joints, and is brought down, the lever hanging almost in a perpendicular direction.

The effective pressure commences when the foot of the bar acts against the periphery of the rounce, and is complete when the bar strikes upon the stop or wooden block; at which time the extended toe of the bar meeting the periphery of the rounce, has caused the bar to drive the table home; which, by means of its connection behind, brings the platten down to meet it, and the lever thus approaching nearer to the perpendicular, exerts all the resistance that its pivots and the pillar-heads are able to bear, and communicates that force through the joint to the platten, by which, the effective pinch is given to produce the impression of the type on the paper.

The inking apparatus is secured by screws and bolts upon two brackets on the opposite sides of the frame, the ductor is the same as commonly used, and which, as it is generally employed, deposits the ink upon a feeding roller, and that upon a distributing roller or surface. The principal improvements in this inking apparatus consist in a contrivance for the purpose of giving an alternating lateral motion to the distributing roller, in order to spread the ink equally upon the two inking rollers.

The raising and lowering of the frisket is effected by the following means. A convolute spring, similar to a watch-spring, is coiled round the axis, or joint, of the frisket and tympan, and by its power the frisket is thrown open; there is affixed to the frisket an excentric pulley, and another affixed to the joint connecting the platten and table: from these two excentric fixed pulleys a cord is extended and fastened, so that, as the platten be[illegible] to turn over, the cord brings down the frisket on to the tympan and confines the sheet of paper.

A contrivance is provided for lifting the sheet off the tympan, after being printed, by the rising of the frisket; a tongue is placed at the top of the frisket, which is held fast by a spring behind falling into a notch. When the frisket is shut down, the point of the tongue slips into a small groove in a piece screwed on to the tympan, and passes about an inch under the sheet of paper, so that when the frisket is thrown up again, the tongue pulls the sheet off from the tympan, and on the frisket striking against a pin fixed to a rest, the tongue will be again forced out.

Thus far Dr. Church's invention has been brought into partial practice; whether his subsequent inventions (or intentions), to which I alluded at the outset of this article, have any chance of being equally successful, I have now to discuss.

The principal object in view is, to print constantly from new type, which is proposed to be effected by simplifying the processes of casting, composing, and distributing. The type is to be delivered perfect by machinery, and laid, as it is cast, with unerring order and exactness, in separate compartments. The compositor's work is then to be effected by other apparatus directed by keys like those of an organ: thus is the type to be arranged in words and lines, as quickly as in the performance of notes of music; to be all perfectly correct, as no error is allowed to be possible except from touching the wrong key: hence, an expert hand will leave but little business for the reader. The forme may be worked as usual, either by the printing-press or machine. It is then found less expensive, under Dr. Church's economical system of re-casting, to melt the type and re-cast it, than to perform the tedious operation of distribution. The melting takes place without exposure to the atmosphere, by which contrivance oxydation, and the consequent waste of metal are avoided. It is calculated that two men can produce 75,000 new types per hour; and, in re-composing, one man is to perform as much as three or four compositors. In the production of types, the saving, we are told, is ninety-nine parts in a hundred; and in the composition, distribution, and reading, three parts in four.

In regard to press-work, Dr. C. has invented a machine to work with plattens instead of cylinders, from which he will be able to take forty fine impressions per minute! Some London printers are said to have ordered these machines and apparatus!! An establishment is about to be commenced in New York, in which these inventions will be applied to the reprinting of popular works, and printing in general!!!

The foregoing account contains the substance of a notice, which appeared in the Monthly Magazine for June 1823.

I do not mean to question the possibility of constructing a machine capable of performing *some* parts of these various operations; or even *all* the parts, in a limited degree. I was at one time a sceptic as to the possibility of printing good work by cylindrical pressure, I have been convinced to the contrary; but will any one who has a practical knowledge of either of the businesses of letter-founding or printing, believe, for an instant, that the usual routine of a day, or of an hour, in either of those branches of typography, can be performed by any mechanical combinations which it is in the power of human hands to construct, without more attendants to wait upon the machinery than could execute ten times the work which it pretends to be able to do of itself. In the first place, would every proprietor or speculator, who purchased a machine, easily find an artist to supply ready-justified matrices and moulds (saying nothing about previous punch-cutting) for the type-casting part of the machine? if not, then would it end in a dangerous monopoly. Then, is it to be cast so wonderfully perfect as to want no breaker, rubber, dresser, &c. Are seventy-five thousand types, per hour, to be shot perfect from the crucible to the tubes? Well—suppose all this done —the *performer*, also perfect in his knowledge of the keys, and beginning to play his lesson—how long would he proceed with his tune without meeting with some unlucky hole in his ballad; without having to call for more performers to *play in concert?* one to help the instrument to space out its lines, set its heads (italic, I suppose, would be provided for by another row of keys and pipes to answer those of the swell organ); then another to set smaller type for notes; a word or two of Greek or Hebrew; or, perhaps, side notes to the work; to space out heads, gauge, and tye up the pages; to impose, correct, &c. &c. Why, to effect this saving of "three parts in four," of a compositor's labour, would take one key-player, two helpers, one reader, one engineer, and one artist, to keep such a machine in repair: and then if a simple key or tracker out of the hundred and fifty-three wanted for the boxes of a pair of cases, should get out of tune, the whole foundry and composing machinery must all be brought to a dead stop. I should also expect a stop of another kind in the progress of the printing machine; if I am at all capable of judging by description between similarity of cause and effect, Dr. Church will be obliged to wait the expiration of the term of another patent for a printing press, before he can venture to set his a-going.

Then, as to its speed: 40 printed sheets per minute, equal to 2,400 per hour; but it is not said, perfected sheets, or sheets printed on both sides; therefore, it will give 1,200 on one side, or white paper, and 1,200 re-iteration. Now, I will venture the assertion of impossibility of any one boy or man pointing 1,200 sheets in half an hour. It has, therefore, been fully anticipated in this respect by other machines which have been proved. But it would be unfair to suppress my opinion, that if it could be brought to act with equal speed as a double or perfecting machine, it would have a great advantage in the *platten* pressure, over that of the cylindrical.

I shall again be indebted to my friend Mr. Newton, for extracts by which to give some idea of these projects, but I must refer my reader to the numbers for November and December, 1823, for a full description and plates, before they can thoroughly understand Dr. Church's *intention*.

This apparatus consists of three pieces of mechanism; the first of which is designed to cast the types, and to arrange them ready for the compositor; the second is to compose those types into words and sentences, by the operation before described; and the third, a press to produce printed impressions from the composition, in the most perfect manner, and with unexampled celerity.

The mechanism designed for casting the types is, first, an elongated box or chest, extending across the machine, which holds the melted type-metal previous to its being admitted into the moulds. In front of this chest the mould for casting the types is placed. The mould is formed by a steel bar extending across the machine. In this bar any number of perpendicular grooves are cut, for the purpose of receiving the fluid metal, for forming the bodies of the types or letters distinct from each other. Below this mould-bar the matrices are stationed, which give the letter or face of the type; and the placing and displacing of these matrices and the mould-bar, to perfect the operation of casting, which must be done with great accuracy, are the most important points which the varied motions of the mechanist have to effect; attached to the machine is a vessel called the fountain, to be filled with melted metal, from whence it flows into the metal-chest above-mentioned. In one of the operations of the machinery (the progressive motion of which will be explained), a plunger is made to descend into the metal-chest, and to displace a portion of the metal therein, which, being prevented from returning into the fountain, rushes with considerable force through small apertures into the respective grooves of the mould-bar and into the matrices, thereby causing a certain number of types to be cast.

The general operation of the machine is as follows: a fly-wheel is actuated by hand, which gives motion to the shaft. Upon this shaft a cam-wheel is fixed, and consequently turns with it. An elevated cam upon the periphery of this wheel, is to be placed under the end of a lever, previous to the commencement of the operation, by which the plunger is held up. As soon as the wheel has revolved sufficiently to slide the cam from under the end of the lever, the plunger is instantly drawn down by a weight suspended to the lever, in which descent of the plunger the fluid metal is forcibly injected through the jets of the metal-chest before-mentioned, into the moulds and matrices by which the types are cast. When the wheel has revolved some distance further, an enlarged part of its periphery comes in contact with the end of the lever and raises it. At the reverse end of the shaft, which carries this lever, there is a short arm, which at this time shifts the mould-bar laterally, and brings the grooves of the mould holding the body of the types, exactly under a series of punches extending from the bar. In this state of the operation it becomes necessary to unlock the matrix-bar, which is done by the progress of the wheel having brought a cam on the inside of the wheel to bear against the end of a lever, the reverse end of which lever slides back a bar holding a series of wedges, and thereby permits the matrix-bar to descend about the eighth of an inch, so as to withdraw the ends of the cast types from these matrices.

The further progress of the wheel causes a cam to strike against the upper end of the lever, the reverse end of which draws forward the matrix-bar from under the types. The types are now to be discharged from the moulds, which is done by the cam (as the wheel proceeds) coming against the end of the lever. This is a compound lever, the shaft to which it is affixed carrying also, at its reverse end, another arm. As this arm recedes, by the pressure of the cam, the first arm forces down the bar with its punches, which project the types out of the mould-bar, and cause them to descend into other guides or square tubes formed to the figure of the types, which slide down them; but in order to arrange the types all in the same direction, and deposit them in files or ranks in a box, the guides are twisted one quarter round, which brings the body of each type into that position required for placing them in the composing machine, to be explained hereafter. After the types have descended in the guides, they are severally pushed backward into the ranges of the box, by means of a pair of guide cams, upon the shaft of the fly-wheel, between which cams the end of the lever acts; and by the obliquity of the cams the lever is made to vibrate and slide the type-projector bar backward and forward, so that at every operation of the machine the types are pushed backward in ranges of the box, each type preserving its erect position.

The cam having passed the end of the lever, the weight attached to the lever causes the punch-bar and punches to rise out of the moulds and resume their former position. The cam now comes in contact with the lower end of the lever, and pushes it back, which causes the matrix-bar to resume its former place beneath the mould-bar, and the locking-up of the matrix-bar is effected by the cam coming in contact with the end of the lever which pushes back the wedges to their original situation. The next motion of the mechanism, as the wheel continues its revolution, is the sliding of the mould-bar into its former position, which is done by the friction-roller at the end of the lever, descending from the elevated part of the periphery of the wheel, which shifts the mould-bar back, and places the grooves for the moulds over the matrices, as before. The cam-wheel having performed one entire revolution, the cam is again brought under the end of the lever which raises the plunger, and another operation of casting at this point commences, and proceeds as described.

The construction of the mould-bar is considered by the patentee to be a very important feature of the invention; it has a channel, with many turnings, cut through it for the passage of cold water, in order to cool the type-metal as quickly as possible after casting: this water is conveyed to the mould-bar by a pipe leading from a reservoir placed in a convenient situation, which water may be discharged at an aperture, and conveyed away by a pipe.

There are several simplified modifications of this apparatus, to be worked by hand, divested of the fly-wheel and most of the levers; but these are not calculated to perform the business with equal facility, or to produce so great a number of types at one operation.

The second part of this series of apparatus for printing, is the machine by which the types are to be composed, that is, selected and associated together into words and sentences. Having disposed and arranged the several sorts of types into narrow boxes, or slips, each individual slip containing a great number of types of the same letter, which is called a file of letters, the cases with these types are placed in the upper part of the composing machine: there are a number of jacks, to each of which a key is connected in a manner somewhat similar to the jack and keys of a harpsichord or piano-forte. There are four rows of keys, which are so disposed for the convenience of gaining space, in order that any one of them may be touched by the finger, and a plate with a number of slits corresponding to the keys, through which slits the heads of the jacks pass. There are precisely the same numbers of files or letters that there are jacks, each file standing exactly over the head of its jack in front of it.

Any one of the keys being pressed upon by the finger will cause the upper part of the jack to advance, and push forward the lower type of the file against which it stood on to the front part of the plate. By the descent of the key a bar extending along the front of the machine, and its arms, will be pressed down, which raises a lever. The end of this lever enters a snail-groove in a snail-wheel, connected by a train to a barrel containing a spring, intended to act as a clock-movement to give motion to the arms in front. The lever acts as a trigger, which lets off the clock-movement every time that a key is depressed, and by the end of the lever working in the snail-groove of the wheel above-mentioned, that wheel revolves only once round upon the descent of each key, being stopped by the trigger at the end of the snail-groove; consequently the movement is not continuous but intermitting, and can only start when the trigger is raised through an aperture from the larger to the smaller radius of the snail-groove.

The nature of clock-movements being well understood, it is only necessary to say that every revolution of the snail-wheel raises and depresses the connecting rod by means of the crank upon its axle; this causes the shaft, which also carries the collecting arms, to vibrate, and thus every revolution of the snail-wheel gives a pendulous motion to the lower ends of the collecting arms, and brings the collectors together. It will now be seen that at the instant after the jack has pushed an individual type out of its file on to the front part of the plate, the collecting arms are actuated by the clock-movement, and by means of the collectors, slide the type from whatever part of the plate it may be situate to the centre. At this precise moment of the operation the larger radius of the snail-wheel will be uppermost, and its periphery acting against a friction-roller at the bottom of the rod, will raise that rod, and thereby depress the longer arm, or front part of the lever connected to it, by which means the type brought to the middle of the plate will be pushed down through an aperture in the plate into the curved channel, which answers the purpose of a composing stick, where the types collect as the operation of the machine composes them into words or sentences, and from whence they may be taken and adjusted into lines by hand, or formed into pages, by means of a box, which may be placed on the side of the machine at the end of the channel.

A mode of adjusting a slight metallic bar on the plate, for the purpose of pressing upon, and preserving the position of the type as it slides along the plate, is suggested; it is to be raised up from the plate, or pressed down upon the type by the operation of the levers, which are worked by connecting rods, extending from the arms, and consequently acting by the depression of the keys; and the winding up of the clock-work is intended to be effected by a treaddle, to which a rope may be attached, extending from a pulley on the axle of the spring-barrel.

The third part of the apparatus is a machine for taking off the impressions of the types on to the sheets,* by a table to receive the forme of types; a platten, firmly fixed and supported by the standards and frame-work; inking-rollers; and friskets.

The machinery is put in motion by means of a handle and fly-wheel, upon the axle of which are pullies, from whence cords coiled in opposite directions, pass to a pulley, and from which an endless chain extends to a pulley at the reverse end of the machine. This endless chain is attached to the frame of the inking-rollers which are drawn backward and forward over the table and forme of types by the endless chain actuated by alternating revolutions of the pullies. Upon the axle of these pullies there is a peculiarly-formed endless screw, with a cross thread, into which a tooth works on the under side, and by that means causes the screw to slide backward and forward in a lateral direction, which locks ultimately into one of the pullies, and thereby effects the direct or retrograde movement of the inking-roller. The supply of ink is taken up from the ductor at every return of the rollers, and the uniform spreading of the ink upon their peripheries is produced by the distributing table, which has a lateral sliding motion.

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* According to the arrangement which I laid down in commencing the chapter on printing machinery, this description of Dr. Church's machine would, in proper order, follow as the last in the chapter succeeding the present; but I have thought it better to give up that plan in this instance, in order to keep Dr. Church's inventions, as having a connection with each other, under one view.

The operation of printing begins thus: the fly-wheel having caused the inking-rollers to pass over the distributing table, and over the forme of types, so as to ink them in the manner above described, the roller-frame when near the end of its race strikes against a slider, which instantly brings forward with an accelerated velocity the frisket carrying the sheet of paper. This stops in the centre of the machine, over the table and forme, and under the platten, where it remains stationary, ready to receive the pinch of the press, in the manner about to be described.

The table carrying the forme, and balanced by an arm and weight, is made to rise and fall by means of jointed pieces, and is guided by the cylindrical sliders working in sockets. The fly-wheel, in a certain part of its revolution, strikes a small lever, which locks the cam to the shaft of the fly-wheel, and causes the cam to pass round with it. The longer diameter of this cam, now pressing against the jointed pieces, brings them almost into a perpendicular position, by which effort to straighten the joint, the table is raised up with great power against the under side of the platten, and the impression given from the forme of types to the sheet of paper. By the further rotation of the cam, the jointed pieces fall back to their former position, and the table descends.

In order to take off the sheet after it has been printed, one of the chaps of a pair of broad nippers is introduced under the edge of the paper, in the following manner. The wheels are made to revolve, by means of cords coiled round them, and which are actuated by a pulley, when the roller-frame advances: by these cords the nippers are carried, and, previous to the impression which has been given to the sheet as above, they are brought into a situation ready to take hold of the edges of the paper, and this is done by the table and platten pressing them together at the time the impression is given. As the roller-frame returns to ink the forme, the nippers draw off the sheet, and by pressing against an inclined plane, the chaps open, and deposit it upon the heap, from whence any number of the sheets may be removed by hand.

The inking-rollers having, on their return, passed over the face of the types, and inked them ready for another impression, and the frisket having by that means been withdrawn, the second sheet of paper is placed upon the frisket, which is brought over the table, and under the platten, by the further progress of the inking-frame exactly as above described; at this time the reverse end of the nippers, with their chaps open, are brought into a situation ready to clasp the edge of the sheet now upon the table. The revolution of the fly-wheel produces the impression as before, and the drawing off the sheet on to the heap is performed in a similar manner. Thus the machine is calculated to print alternately sheets laid on at either end, and to deliver them on to the heap above the platten.

The velocity with which the operation of printing may be performed by this apparatus is stated to be about forty sheets per minute.

In order to produce a correct register, points are fixed to the friskets, in a similar manner to the register points in ordinary printing. These points advance with the friskets under the platten, and enter small holes in the tympan when pressed. On the under side of the friskets, there are small wedge-formed pieces which drop into corresponding recesses in the table, by which means the friskets are compelled always to settle in one particular part of the table, and by that means a perfect coincidence of register is effected.

To prevent the press from closing by the too rapid velocity of the fly-wheel, before the pressman has accurately placed his sheet, there is a contrivance attached to the fly-wheel for throwing the mechanism out of geer. This is effected by means of a pendant rod hanging against the side of the upper rail, which is attached to a short lever, or catch, that drops into one of several notches, or a ratchet on the axle of the fly-wheel. The pressman has, therefore, to touch the pendant rod when he has adjusted his sheet, which immediately connects the mechanism to the motion of the fly-wheel, but until that is done, the wheel revolves without moving the other parts of the mechanism.

In order that the forme of types may be conveniently placed upon the table, previous to commencing the operation, the platten is made to slide from over the table, and, on being re-placed, is fixed by the head-screws firmly to the standard pillars.

Another modification of this apparatus is proposed, in which the pressure is given by drawing the platten down, instead of raising the table up, which has some similarity to the printing press invented by the same patentee, and previously described.

After the forme of types have been used, and the desired number of impressions taken, instead of distributing the types in the ordinary way, they are to be put into the melting-pot, and re-cast by the apparatus first described, by which all the types of one letter will be ranged in files, as before described, and placed ready to be operated upon by the composing machine.

But surely this, wonderful as it may seem, is far exceeded by the proposed application of machinery to the work of the head as well as of the hands?—See what follows!

MACHINE FOR CALCULATING AS WELL AS PRINTING.

Charles Babbage, Esq. F.R.S. London and Edinburgh, &c. in a letter addressed to sir Humphry Davy, president of the Royal Society of London, has announced to the world, that he has invented various machines, by which some of the more complicated processes of arithmetical calculation may be performed with certainty and dispatch; and in order to avoid the errors which might be produced in copying and printing the numbers in the common way, the ingenious inventor states, that he has contrived means by which the machines shall take, from several boxes containing type, the numbers which they calculate, and place them side by side; thus becoming at once a substitute for the computer and the compositor.

The scheme of Mr. Babbage is, however, much more within the scope of probability than that of Dr. Church. He does not go to the casting-type process—his authorship and composing go no further than the ten figures—and his object is, to effect accuracy where it is of great consequence, so that it may, perhaps, be of general benefit.

POUCHEE'S PATENT TYPE-CASTING.

In this place, as the patent was published too late for that part of the work immediately relative to type-founding, it may be appropriate to mention the machinery of M. Henry Didot, of Paris, made patent in this country by Mr. Louis John Pouchee, for casting type at the rate of 24,000 per hour. A trial was made of M. Didot's invention some years ago by Mr. H. Caslon, but it was not found eligible to pursue it: however, Mr. Pouchee has now taken it up, and therefore a short description shall be attempted, particularly as I see no absolute impossibility of so far effecting the object, after all preliminary arrangements of justifying the matrices are complete, as to cast 200,000 an hour, if desired; since Mr. Pouchee does not pretend to the wonderful perfection with Dr. Church, as to be able to shoot the type from the moulds into the composing-boxes all complete and perfect; but by a very few words, of large import, allows the necessity of rubbers, dressers, pickers, &c., for he says "from whence they are broken off and dressed by hand in the usual way." But I shall be astonished if ever it is brought to such perfection as to bear the critical examination of English judges of typography, as to perfection of what in type-founding is called *justification*, or that every letter of each set of these moulds stand equally and identically square to the body, and ranging at head and foot.

The machinery consists of a mould formed by a combination of steel bars with grooves and matrices, which are secured by a frame and brace of iron, upon a strong wooden bench; a lever carrying a heavy rammer is intended to fall down into the middle of the mould, for the purpose of driving a portion of fluid type-metal through small apertures into the grooves and matrices, where the body and face of the letter are cast. The manner in which this apparatus is constructed is fully explained and shown in the Lond. Jour. of Arts and Sciences for May 1, 1824.

Several bars, that constitute one side of the mould, are put together. A bar with horizontal grooves, forming the bodies of the respective types, is made fast by screws to a bar which receives the matrices. Each of these matrices has the face of the intended letter stamped into it, and they are so arranged that they individually stand opposite to the respective grooves of the bar. On the top of the matrices a bar is fastened for the purpose of holding them securely in their places; a straight bar is laid upon the bar before-mentioned, as a cover to the grooves, in order to form the upper sides of the square recesses; the break-bar is placed in front of the first bar; it has a series of small nicks, or openings, which come exactly opposite to the ends of the grooves; and through these nicks, or openings, the fluid type-metal is to pass into the groove and matrices, where the body and face of the letter are cast. The spaces between the nicks of the break-bar coming against the side of the grooves, are to close them and form the feet of the types: another bar is to be laid upon, and form the cover of the break-bar, and these when so combined produce one side of the type mould.

In the recess between the moulds the fluid metal is to be poured to a certain height, and from thence it is ejected and driven into the moulds by the descent of the rammer hereafter described. The several bars being combined, and laid upon the solid metallic bed, the lateral pieces of the frame, which turn upon hinge-joints, are then brought to bear against the sides of the mould-bars; the top-piece is next placed over them, and the whole is made fast by bringing the looped part of a swinging lever to bear upon the nose or projecting end of the top-piece. This swinging lever is brought up to its bearing by means of a tongue, which is forced against the lower part of the lever by the action of a hand lever.

The mould is now ready to be employed for casting. A quantity of fluid type-metal is poured (by means of a ladle) into the central recess of the mould. The rammer is now to be let fall into the recess, which is done by drawing a trigger, when a string connected to it pulls back a bolt or catch, and the long lever instantly descends with the rammer. By this means the fluid metal, previously occupying the lower part of the recess, is displaced from thence by the rammer, and having no means of escaping, is driven with great force laterally into the moulds and matrices.

The operation of casting having been thus performed, the next consideration is a mode of withdrawing the types from the moulds. To do this the workman places his foot upon a step, or treaddle, when the end of the compound lever acting against a pin under the leg, throws up the lever sufficiently high for the workman to take hold of the handles; he then lifts the lever until it has passed the spring catch, and there he leaves it supported. A hasp in front of the table is now raised, when the swinging lever, being released, quits the tongue of the top-piece, and allows the frame of the mould to be opened.

The mould and the cast within it is now removed from the bench, and placed upon a table provided with cramps, which hold the solid part of the cast, while the mould-bars are carefully drawn asunder by wrenches, leaving the types standing out on each side of the cast, like the teeth of a comb, from whence they are broken off and dressed by hand in the usual way.

It would appear, from the above description, that in many parts of the process there is a complete identity in the machinery of M. Didot, and Dr. Church, and this, according to the law of patents, will put the exclusive right of the latter to any part of his patent, in some jeopardy, if ever contested: but I think an English expired patent anticipated them all; at least, that this idea of casting type in multiplied moulds is not entirely novel, will be seen by referring to an expired patent of Mr. W. Nicholson.—*See Repertory of Arts*, vol. v, pp. 145—170; also, chap. vii, *post*.

An artist in Scotland (Mr. Hugh Wilson, engraver, Glasgow) has been trying, by model, to make a self-inking press, upon a nearly similar principle with Mr. Napier's. Mr. Wilson does not profess it necessary that the entire construction of the press should be with a view to the application of his inking apparatus, but that it may be applied to all the common presses at present in use.

Two composition rollers are attached to the tympan by means of two horizontal arms, or bars, connected at their extremities by a cross-bar passing through a wheel which runs on a centre-bar, fixed in the carriage. When the tympan is thrown up, the roller-frame is pushed back by two connecting bars, extending from the tympan to the extremities of the cross-bar. By the motion produced in pulling or throwing up the tympan, these two rollers, which have been previously inked by the distributing and feeding rollers, are drawn across the types, which are thus inked in their turn. When the paper which is to receive the impression is put on to the tympan, and the tympan is brought down upon the types to pass under the press, the two rollers are again made to pass over the types. The passing of the rollers twice over the types before an impression has been made, produces an effect in inking them equivalent to what would be produced by drawing the single roller four times over them; which is all that is reckoned necessary to distribute the ink equally over the types, so as to render the impression clear and uniform.

The paper and types being thus prepared to receive the pressure, the carriage is moved forward on wheels by the common winch, or moving handle, so as to be brought directly under the centre of pressure. The pressure in this press is produced by *means of an excentric wheel, below the type-carriage when in this* position, working against a friction wheel, and forcing upwards a metal block which slides in grooves, and in its turn forces the type-carriage up against the platten, which is fixed, and thus produces the impression.* The excentric wheel is put in action by a handle, or lever, similar to the one in common use, and the motion of this lever is communicated to the wheel by means of a universal joint. The excentric wheel being made to describe one quarter of an entire revolution in producing the pressure, gives motion also to the feeding roller, which, by its means, is made to turn round a certain proportion of a revolution according to the nature of the work and the quantity of ink required.

The feeding roller is supplied with ink by means of a trough and scraper. While the impression is being produced, the distributing roller is brought in contact with the feeding roller while in motion, and receives a sufficient quantity of ink for the next impression.

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* Another invention at least very nearly approaching to Mr. Ruthven's.

While the carriage is returning to its first position, the distributing roller is kept revolving by means of a small friction pulley on the end of it, and a cord stretched between the extremities of the carriage-frame, and is thus made to distribute the ink over the whole surfaces of the other rollers. When the tympan is thrown up to take out the impression, the rollers are again brought over the types, and the same operation is repeated which has been described.

There is another contrivance in this printing press, which must not be omitted. The tympan is so constructed, that the paper which is to receive the impression is made to revolve on its centre, and after having received an impression on one side in the manner described, it can be turned by the pressman in an instant, thrown down on the types, and an impression on the contrary side taken before the rollers could have been inked and the types prepared for such an operation in the common mode of printing. How useful this contrivance must be, if effectual in printing jobs which require to be done in this way, must be obvious to those acquainted with it; excepting that most jobs are only required to be printed on one side. The various other contrivances, however, exhibited in this model of a self-inking press, may render it an object well worthy of the attention of engineers in this department of machinery.

A very clear engraving and description of this model will be found in the Glasgow Mechanics' Magazine, of 5 June 1824, No. XXIII.

Mr. Ruthven constructed a self-inking apparatus, to be attached to his press, which would not require any additional movements for the workman: a trough for the ink was placed at the left-hand end, across the press, with the usual application of the iron cylinder and composition rollers. The last, or inking roller, being fixed in a frame made to open like a pair of compasses by a connecting rod attached to the joint of the tympans, the raising of which would bring forward the roller over the forme. To render the distribution of the ink perfect a roller was constructed to accompany the last-mentioned one, having also a lateral movement while revolving; on bringing forward the platten and turning down the handle; a supply of ink would be taken and distributed on the rollers.

MR. COPE, of New North-street, Finsbury-square, is the manufacturer of a press in which the power is gained by motion differing from those already described, and in a very simple and efficacious manner. It may be described as a hinge, or knee-pan joint, the parts of which, as brought by the lever into a vertical position against each other, cause the descent of the platten. The staple of this press is all in one piece of cast iron, like the Stanhope or Columbian, and it appears altogether to be got up so as to be afforded at a very cheap price.

MESSRS. TAYLOR (brother of Mr. Richard Taylor, the printer) and MARTINEAU, of the City Road, have made several presses of a construction in which the power is gained by a principle somewhat similar to that last described; there is a combination of inclined planes, or wedges, acted upon by bars, with hinge-joints: a lever bar, and coupling bar, working in projections on the staple, or general frame of the press, connect with the bars, which move from an angular into a perpendicular position when the impression is required: a regulating screw in the head raises or lowers the upper wedge: two rods are acted upon by a lever to counteract the weight of the platten. The workmanship is excellent, and the press highly spoken of. It is named the Russel Press.

PATENT TYMPANS.

HAVING done, as I trust, impartial justice in describing all the manual printing-presses which have come within my knowledge, being the inventions or improvements of others, it may now be allowable for me to enter upon a description of an apparatus invented by myself.

It consists of improved tympans applicable to presses of the usual construction, but of enlarged dimensions. In the peculiar make of these tympans consists the advantage which such a press is capable of affording; namely, that of enabling a printer to enter into a competition of price with the printing machines impelled by steam, or mere manual power; *provided he is supplied with double-royal or double-demy paper.* The difficulty of obtaining this, as a general commodity in the market, particularly in the low-priced papers for ordinary work, was the only objection which ever operated against this patent, until the success of the machines (to be described in the following chapter), gained a more material advantage in respect of speed for periodical publications; and so far surpassed the capabilities of my mode of working, as to drive me into the adoption of a machine, and the abandonment of my own invention, as soon as I found one constructed upon a principle which appeared to possess every requisite qualification for good as well as expeditious work, without the appendage of a steam-engine.

However, it answered my purpose to a considerable extent: I gained, so far, one very material object which I had in view, namely, the retaining in employment, and keeping up a succession of, the regular-taught pressmen, at the same time that I was opposing the intended monopoly of all press-work of long numbers. I worked two double-demies pretty constantly for five or six years, printing some hundreds of reams of paper, and keeping together business and connection which would otherwise have fallen into the hands of the proprietors of the steam-engine machines.*

The operation consists in the working off *both formes* of a sheet at *one time,* and with *one impression,* upon paper of *double size,* viz. double royal, demy, crown, post, foolscap, &c. by the means of a press of adequate dimension and power; and by the same action, with the addition of these tympans, without any increase of labour time, or motion, at the moment the impression is given to the paper, it is divided into sheets of *single* royal, demy, &c.; and this with such an undeviating precision of line parallel to the pages as no cutting by the most careful hand can ever attain. The tympans may be affixed, at pleasure, to a common royal-size press, which may thus be made to work (and cut) double foolscap.

They are shown in perspective at figs. 1 and 2. Fig. 1 represents the tympans turned down upon the press, with the hindmost part of the inner tympan opened, to show the internal part. These tympans consist of, first, the outer frame, of dimensions according to the size of the press or work required; the additions to which are, a plate of iron, steel, brass, or other sufficient substance, about seven-eighths of an inch in width, *a a;* the back side, fig. 1, of which is level, but the front side, fig. 2, is raised in

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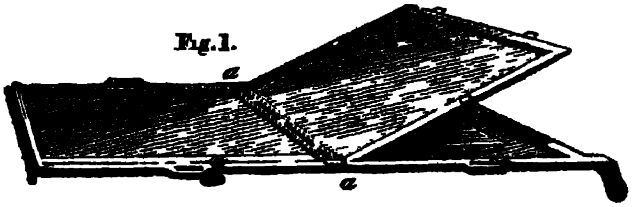
* The saving, in ordinary work, was twenty per cent; finer work twenty-five; foolscaps 30 to 40; on finer work still more.

Fig. 1.



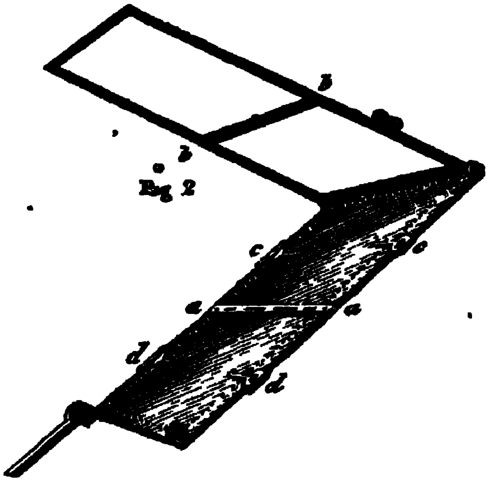


Fig 2

Fig 3

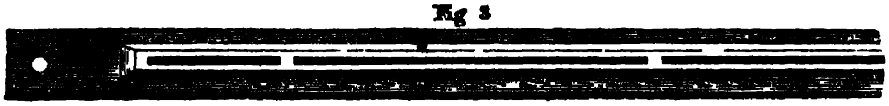


Fig 4

Fig 7.

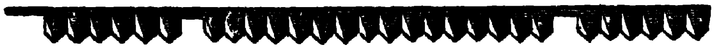


Fig. 5.

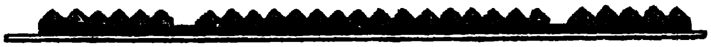


Fig. 6.

the middle, the centre part being about one-fourth of an inch in thickness, and the two sides about one-eighth of an inch only, a part of the top or front of which is shown in full size, fig. 3, and cross section of the same, fig. 4; along the middle or thicker part are cuts or openings for the purpose of admitting the knife hereinafter described, leaving small parts of the plate uncut, as seen in fig. 3. On each side of the same, along the centre of the thinner part, is a row of small holes, at about half-inch distances. This plate is fixed across the middle of the outer tympan, to each side, being countersunk into the same, *b b*. Secondly, the inner tympans are formed of two parts, having each part three sides, and moving on pivots, near *a a*, attached to the outer tympan; these inner tympans, when shut down, are fastened in the common manner by hooks and eyes, or buttons; each part, when opened to adjust the blankets, will incline back on the pivots.

The *Divider*, or *Knife*, is shown, in front and back view, figs. 5 and 6, and section of the same fig. 7, and is seen fixed on the frisket, fig. 2, *b b;* it is made of a plate of iron or steel, about three-fourths of an inch wide, turned down at a right angle on one side, about one-fourth of an inch in width, and in length sufficient for the width of the sheet of paper intended to be cut, and this must be fixed so as to be exactly corresponding to the openings in the plate *a a*, before described; the part so turned down is cut into angular teeth, about a quarter of an inch from point to point, each tooth having two chisel-like edges, formed by being filed and dressed on the outside of the part so turned down; on the inside of the angle the teeth are to be finished all along fair and smooth; one or more of the teeth are then to be filed out at intervals corresponding with the parts of the plate left uncut. The pivots, or joints, of the tympans and frisket being accurately adjusted, the knife is then fixed to the frisket (at each end by screw or other connexion), so that when the frisket is turned down on the tympans, the knife shall freely enter the plate at the openings before described. The plate and knife now occupying the usual place of point-screws and points, those necessary articles are removed to the centre of each half of the tympans above and below the plate, as *c c d d*. If wished, the positions of the plate and knife may be reversed, by fixing the plate to the frisket and knife to the tympan, or a plate both on frisket and tympan, and knife to the forme or table of the press, but not with equal certainty of operation. All these parts being properly adjusted, the mode of application is as follows: for making ready a forme, or sheet, the tympan sheet is drawn on the tympan, as in the ordinary mode, and the frisket pasted and cut out; but for working the first side of the paper the knife must be displaced: the whole of the paper being worked on one side without the knife, it is then replaced, and the reiteration proceeded with; the sheet will then be divided exactly along the centre, excepting at the parts where the portions of the plate have been left uncut, and the teeth filed out of the knife, as before described; which uncut parts answer the important purpose of keeping the double sheet adhering as one, for the pressman who may be pulling, to draw it off the tympans over to the bank, where it is finally parted by the other man, who is inking, while looking over his heap, when six or eight sheets are accumulated, by means of a gentle pressure with each hand at each end of the heap; the white paper, or first side, is worked with four points, placed opposite to each other in the middle fold of each half of the double sheet, as *ccdd;* but for the reiteration the two lower points, *dd,* are taken off, and the sheet kept in register by the two upper ones only. For cutting the sheet into more parts than two, I extend the same principle, by placing knives and plates in various positions, or at right angles with each other.

The *Demi-*(or half)*-chases* are made so as to contain the pages imposed within a less measure of square than usual; one side of the rim is made particularly straight, and rather less in breadth than the other three sides; this narrow side forms the part to lie in the middle of the table of the press; by turning a pair of chases so made on contrary faces, the two narrow sides will join and form as one chase; the pages are not in these chases, as in others, for all sizes above folios locked up by having side-sticks and quoins on all four sides, but only on one side and at each end. The inner forme being locked up on the right side only, and at each end, and the outer forme on the left side only, and at each end; and the margin being made when the two demi-chases are laid together on the imposing stone, as if the same were one large chase of double dimensions, the pages will require no more margin in the centre of the double sheet than a fair equal proportion for the division of margin. The cha[illegible] must be made in proportion to the size of the work intended to be executed.

The *Girths* are formed of lines made of any close-formed strong material or substance, but round or narrow, and I particularly prefer catgut of about one inch in circumference; such lines I arrange in pairs, one pair to run the table in, the other pair to run it out, applying them to the wheel after the manner of leather or web girths; except that such lines I place with a small degree of obliquity from either end of the table to the wheel, so that in winding round no one coil shall touch or interfere with the other, but take a spiral direction, one pair giving place by being wound off the wheel as the table is run in or out, to the other pair, which by being then wound round the wheel causes the table to traverse in the given direction; by these means the rounce, or handle, will be, in every position, or turn of the wheel, equally tight, and no friction or adhesion of the lines can ever take place.

The patent embraces some material improvements in the mode of *blocking*, or mounting stereotype plates to the necessary height for printing (for which see Chapter on Stereotype), and some other improvements in the machinery and process of printing; viz. Chases, necessary to obviate the inconvenience of excessive size of double formes—Girths, with which the most heavy press can be run in and out with the greatest ease, &c.; but as these things are more of technical than public utility, I have thought the enrolled specification the only necessary place for inserting particulars.

PRINTING MACHINES.

CHAPTER VII.

Of Steam-engine and other Machinery applied to Printing—General feature—Mr. Nicholson; his Patent, as containing the Principle of every subsequently-invented Machine for Printing—Machine of König—The Times Newspaper—Mr. Bensley's first application of it to Book-work—Machines of Applegath and Cowper—Rutt—Brightley and Donkin—Bacon—Cooper and Millar—Applegath again—Bold—Sir William Congreve—Parkins—Mr. Spottiswoode—Mr. Hansard; Napier's NAY-PEER.

DURING the progress of this work hopes have been continually indulged that any delay in its publication would be compensated by finding the trade subsiding into something like a settled state, and enabling this chapter to be so far completed as to present a full account of the various machinery used in printing; but since the first application of the steam-engine to this business the inventive genius of the age has been particularly alive to the improvement of the art which is ultimately the improver of all others, and no sooner has a clear description, and satisfactory opinion been formed of one invention, than another has started into notice, with, of course, some pretensions to superiority over all those that have preceded it.

One general feature in the various inventions above referred to for improvements in (the speed of) printing, with the exception of one not yet generally known, is first the substitution of two cylinders, or of one cylinder and a plane, for producing the impression, instead of the two plane surfaces of the ordinary, or Stanhope press; and secondly, the use of cylinders covered with the adhesive and elastic composition, for applying the ink to the surface of the forme of types, as described in a preceding chapter, which, in the old process, was laid on with large balls, or dabbers.

For these important ideas both the public and the patentees of printing machines seem to be indebted to Mr. William Nicholson, the editor of the journal bearing his name, who obtained a patent for them in the year 1790. Upon referring to this patent,* descriptions of which have been given in the Repertory of Arts, the Pantologia, and other scientific works, it appears that Mr. Nicholson has completely taken the lead upon this subject; and it is probable, that had he joined the actual practice of the art of printing by machinery to his knowledge of the theory, little would have been left for subsequent mechanicians to perform, and still less to be claimed as their original inventions.

Those parts of the specification relative to our subject, refer, first, to casting the type; secondly, to applying the ink; and thirdly, to taking the impression. The first of these relates to the formation of the mould, so as to cast two, three, or more letters at one pouring in of the metal;† and to the finishing the stem of the letter, so that the tail is rendered "gradually smaller the more remote it is, or farther from the face. Such letter may be firmly imposed upon a cylindrical surface in the same manner as common letter is imposed upon a flat stone." * * * * "To be imposed in frames or chases adapted to the surface of a cylinder of wood or metal." * * * * The ink, &c. is proposed to be applied by a cylinder covered with leather, pelts, &c. with "two, three, or more smaller cylinders, called distributing rollers, moving longitudinally against the colouring cylinder, so that they may be turned by the motion of the latter." * * * * The impression is designed to be effected by another cylinder causing the paper to pass between "two other cylinders, or segments, in equal motion, one of which has the blocks, forme, plate, assemblage of types, or originals attached to, and forming part of its surface, and the other is faced with cloth, or leather, and serves to press the paper, cloth, or other material, as aforesaid, so as to take off an impression of the colour previously applied." This he varies many ways, in the usual see-saw language of patents, applying his invention "to the printing of books in general, paper-hangings, floor-cloths, cottons, linens, silks, ribbons, laces, leather, skin, and every other flexible material whatsoever." He then gives descriptions and drawings of the presses and apparatus to effect the intended purpose, either by means of the types, &c. fixed to the cylinder, or to formes, or plane surfaces submitted to the action of the cylinder by being laid on planks passed horizontally between them; the whole of which may be found, with the specification of the patent, in the work just referred to.

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* See Repertory of Arts, vol. v, first series, pp. 145—170; plates 8, 9, 10.

† See *antè*, Dr. Church and Pouchee.

My reason for giving so detailed an account of a patent for printing machinery which, having been taken out upwards of thirty years ago, has so long since expired, is this: from the arrangement of his proposed colouring cylinder—of its subordinate, or distributing cylinders—of the impression cylinder—the plane table—the mode of catching up the paper and carrying it round the cylinder—the impression cylinder, whereby the paper is pressed against the type as that cylinder revolves, and by which means the sheet was to be printed—these, and many other parts of Mr. Nicholson's machine, as described in the specification, show that all subsequent attempts at machine-printing are but so many modifications of the same principle, rendered at last practicable by the invention of the composition for covering of balls and cylinders; without which, I risk nothing in saying, that no printing machine, at present invented, would ever have been rendered in the least degree effectual.

Again; Mr. Nicholson's idea (impracticable as I conceive it to have been in carrying on the various indispensable processes of proofs, revises, authors' corrections, &c.) of composing and imposing wedge-formed type, was in some measure modified and brought into practice by the pans, or galleys, of Mr. Bacon, fixed so as to form a rectangular frame, or prism, upon his cylinder, to revolve against one cylinder, or segments of cylinders, for inking, and another for pressure. And since Mr. Bacon, Applegath and Cowper's stereotype plates, cast or bent to form segments of a circle, so as to be fixed on a cylinder, are but substitutes for a like purpose.

The means, however, which Nicholson specified for distributing the ink were essentially defective; and the other parts of his invention were but very imperfectly carried into effect.

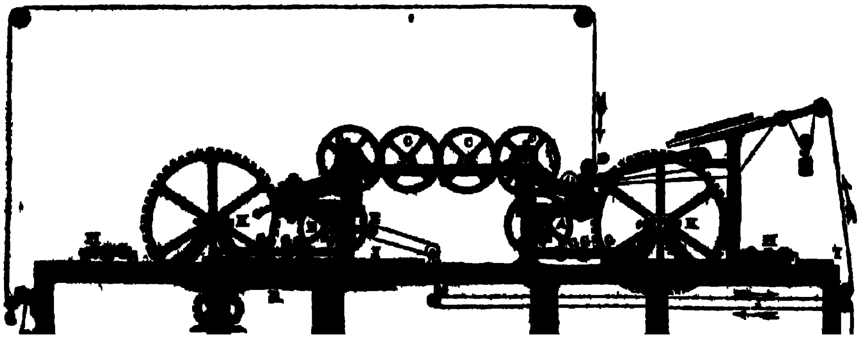
It is scarcely necessary to observe, that the great object in the employment of machinery is to lessen the expense of printing; and that the comparative merits of the various printing machines must be determined by this common and final standard.

In order to obtain this most important result, it is obvious that, in the construction of a machine, simplicity, durability, and a constant aptitude or readiness for working, are the first and most essential requisites; without which the most ingenious combination of mechanical knowledge, however highly to be esteemed as a piece of work, will produce little or no advantage to the proprietor or the public.

In the attainment of the above-mentioned requisites, one of the principal difficulties to be overcome is the equal spreading, or, as it is technically called, distribution, of the viscid and adhesive ink upon the face of the types, for which purpose very elaborate and costly apparatus has been made use of in other machines, and subsequently removed by the invention of the composition-covered cylinders. By this improvement, adapted to a printing machine, the perfect distribution of the ink appears to be attained by very simple means, and the same hue or shade of colour is preserved by the most trifling degree of attention, with a regularity which cannot be effected by the hand-rollers of the common class of workmen.

The engraving represents the elevation of a machine, worked by steam, or other competent power, for printing both sides of a sheet of paper, in which the sheet is conveyed from one cylinder to the other, by means of endless cords combined with a series of conveying cylinders, or drums.

The following little section will serve to give a general idea of the principle upon which these machines are constructed.



A is a cylinder, which gives the first, or white-paper impression. B, a similar cylinder, which gives the second impression, or iteration. C C C C, cylinders, or drums, over which the sheet of paper passes in firm contact, being held by the pressure of endless strings; the sheet of paper ends at D, and comes out of the machine, printed on both sides, at E. The course of the strings and drums is indicated by the arrows.

The rollers for inking, in a machine of this construction, according to the last improvements of Mr. Cowper, lie horizontally upon a plane smooth surface, called a distributing table, in open notched bearings, acting by their own weight, and revolving by the friction of their surfaces against the surface of the table, without wheels, springs, or any other machinery whatever; so that, on the ground of simplicity and readiness for working, nothing can excel the contrivance.

The inking apparatus consists of an ink-trough, a plane surface, and rollers; the type passes under the rollers, G G G; the rollers, H H, assist in distributing the ink upon the surface of the distributing table, I, which is fed with ink from a trough on the spindle of the wheel, K, by means of a vibrating roller, which cannot be seen in the drawing.

The rotatory motion of the printing cylinders and drums is produced by a train of wheels at the back of the machine, and the distributing tables upon which the formes are placed move backwards and forwards under the cylinders A and B, and the rollers G G G, by means of a double rack, R, beneath the table.

The printing machines of König, Walters, Bensley, Applegath and Cowper, Donkin, Brightley, Rutt, Winch, Cooper and Millar, Congreve, Wood, Napier, and lastly, My Own, all possess one and the same general principle, applied in a variety of forms. The formes, fixed on the carriages (the ink being communicated to the face of the type by an arrangement of rollers), are drawn under a cylinder, on which the sheet being laid, the impression is taken off on one side. The sheet is then conveyed to a second cylinder, by the rotation of which it is carried on to *the second forme*, or reiteration, and the sheet is perfected; or, to speak intelligibly to those who are not of the profession, the other side is printed. All the manual labour in this process, by those impelled by steam or other machinery, is performed by two boys, one of whom lays the paper on the first cylinder, while the other receives it from the second cylinder, and lays the heap perfectly even.

Mr. König was the inventor of the first steam-engine printing-machine [illegible]ught to maturity in this country, and which he erected [illegible] Mr. Walters, proprietor of The Times newspaper. "Whether he was indebted to Mr. Nicholson for his elementary principles, or whether almost the same ideas spontaneously occurred to each individual, is a question that can only be satisfactorily solved by the former."

The Literary Gazette of October 26, 1822, contains a brief notice of the origin and progress of this invention, and its first application to the purposes of book-work, with an excellent perspective view of the machine. As I have been kindly offered the use of the engraving, I shall adopt the description also.

MR. BENSLEY'S PRINTING MACHINE.

"M. König, by birth a Saxon, and by occupation a printer, many years ago conceived it possible to print by steam, though he then expected no more than to be able to give accelerated speed to the common press, to which end his first efforts were bent. As from the nature of such an undertaking, considering the state of scientific pursuits in his native land, he could calculate on little success unaided by others, and failing in his application for encouragement and support at the hands of the most eminent printers in several of the continental capitals, he turned his eyes towards England. Arriving in London about 1804, he submitted his scheme to several printers of repute, who, not being disposed to incur the risk of property which a series of experiments were sure to incur, and perhaps placing little confidence in a successful issue, received his overtures very coolly; and it is probable his applications in this country would have shared the fate of similar attempts abroad, had he not finally been introduced to Mr. Bensley senior, who, attracted by M. K.'s plans, speedily entered into an arrangement with him. After a short course of experiments on the fabrication of a press which should have accelerated motion, and at the same time render the work of the man who inks the type unnecessary, the above gentlemen were joined by Mr. G. Woodfall and Mr. R. Taylor, the former of whom however soon retired. The remaining three, i[illegible] wise discouraged by the tediousness and expense which all who are conversant with the progress of any invention in machinery well know to be unavoidable, persevered amidst unforeseen perplexities, which were doubtless not diminished by the parties' deficiency in practical mechanical knowledge.

"It was at length discovered that the intended improvement of the common press could not be brought to bear; and that much labour and prodigious expense would be thrown away, unless more radical alterations were invented.

"Cylindrical printing was now thought of—and after some two or three years of renewed exertion, a small machine was brought forth, the characteristic of which was, that instead of the printing being produced by a flat impression (similar to the press) the sheet passed between a large roller and the types still flat; and in lieu of the old fashioned balls, used by hand to beat over the types and so to communicate the ink to their surface, skins were strained round smaller rollers, on which it was contrived to spread the ink, and under which the forme, *i. e.* the frame in which the types are fixed, passed in its way to the printing cylinder. Considerable promise of success attended this production; and after continued experiments it was deemed practicable to extend the general principles to a more powerful machine. To print a newspaper was considered highly desirable—and on exhibiting to Mr. Walters, proprietor of the Times newspaper, the machine already erected, and showing what further improvements were contemplated, an agreement was entered into with that gentleman for the erection of two large machines for printing his Journal. So secret had been the operations of the patentees, that the first public intimation of their invention was given to the reader of The Times on Monday the 28th of November 1814, who was told that he then held in his hand one of many thousand impressions thrown off by steam. At this time but few persons knew of any attempt going on for the attainment of the above object; whilst among those connected with printing, it had often been talked of, but treated as chimerical.

"The machines at the Times office, cumbrous and complicated as subsequent improvements have made them appear, are yet, in many respects, admirably adapted to the purpose for which they were erected, and it is believed will outlast many contrivances for printing which have been since brought out.

"The next advance in improvement was the manufacture of a machine for Messrs. Bensley, distinguished from those before mentioned, by the mode of perfecting (or printing on both sides) so that the sheet of white paper is placed in the feeder and delivered from the machine printed on both sides. In addition to the essential difference between this machine and those previously made, it came forth with many obvious improvements, though still unquestionably complex: and for the first attempt at effecting register (causing the pages to fall precisely on the back of one another) a greater degree of success than might have been expected was attained, subsequent experience showing the many difficulties to be surmounted in the accomplishment of this object. Deficiencies were now detected in the inking: the strained skins were found uneven in their surface; and attempts were made to clothe the rollers with an elastic preparation of glue, treacle, &c. which has at length attained perfection.*

" By this time the invention had attracted the attention of various individuals, who thought the manufacture of printing machines an easier task than they afterwards found it to be; and far the greater number of attempts, we believe, failed almost as soon as undertaken. A machine, however, similar in its capacities to that last mentioned, but much more simple in its construction, has been brought out—under the direction of some eminent

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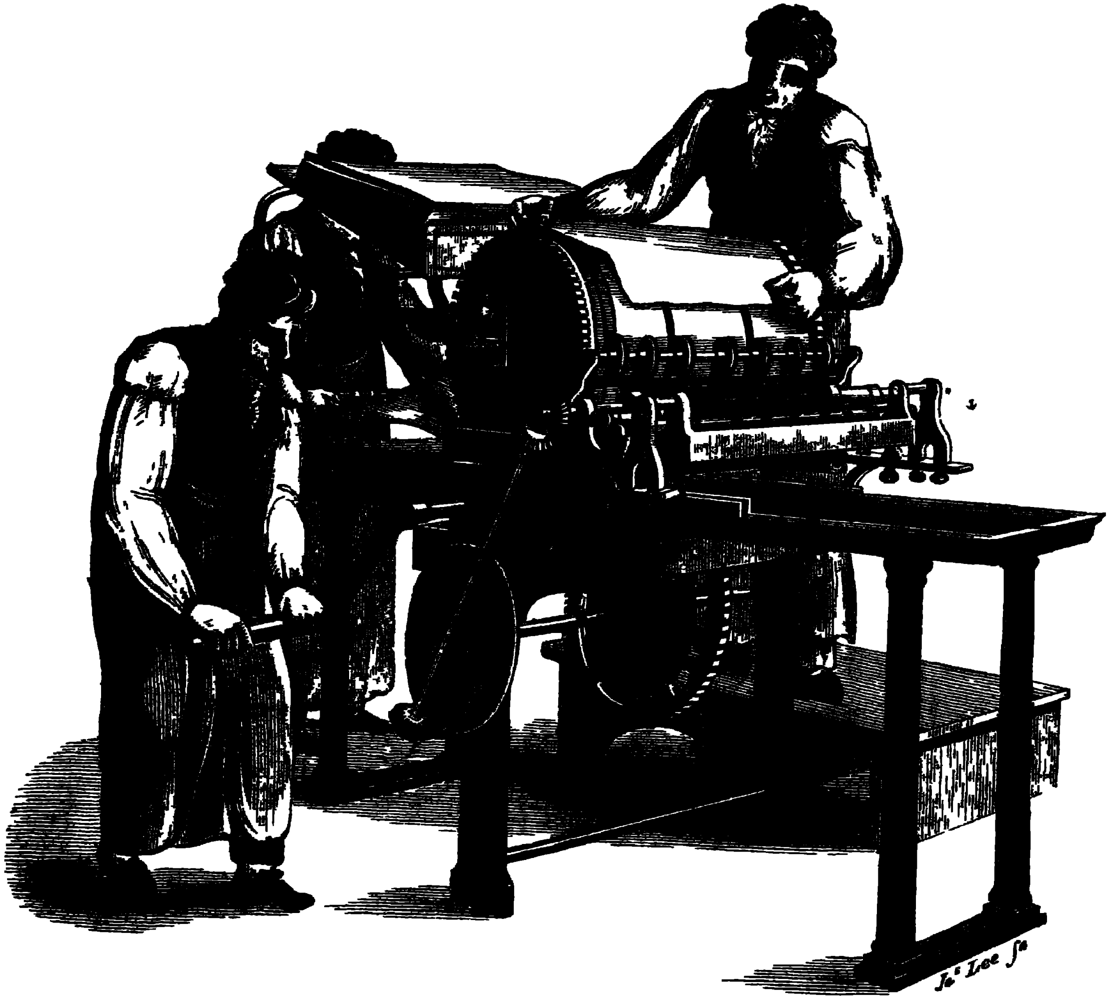
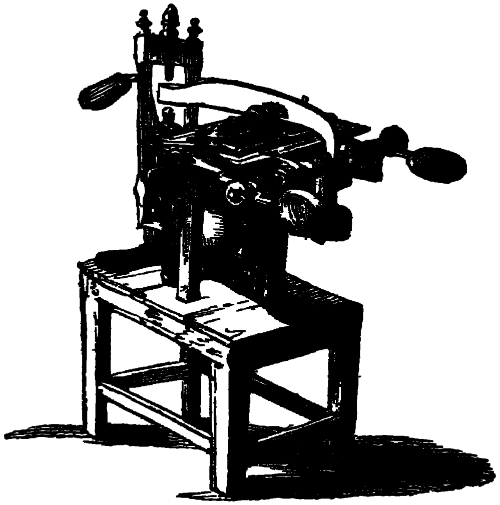
* So sanguine were the patentees of having now arrived at the *ne plus ultra* of their labours that they issued a Prospectus, dated March 18, 1817—offering three different sorts of machines at a high scale of prices, and, besides demanding a large sum, to be paid as purchase money, further requiring a considerable annual premium, calculated upon a principle most effectually to prevent any one from venturing to erect a machine. This prospectus presents a Table of Expenses and Savings, which, [illegible] being *now* perused by those who have had some experience of the [illegible] of printing machines, can only create a smile, or perhaps a wish that they could realize all the advantages so [illegible] held forth! It needs scarcely be added, that after the issuing of this prospectus, the original patentees never sold a single machine!

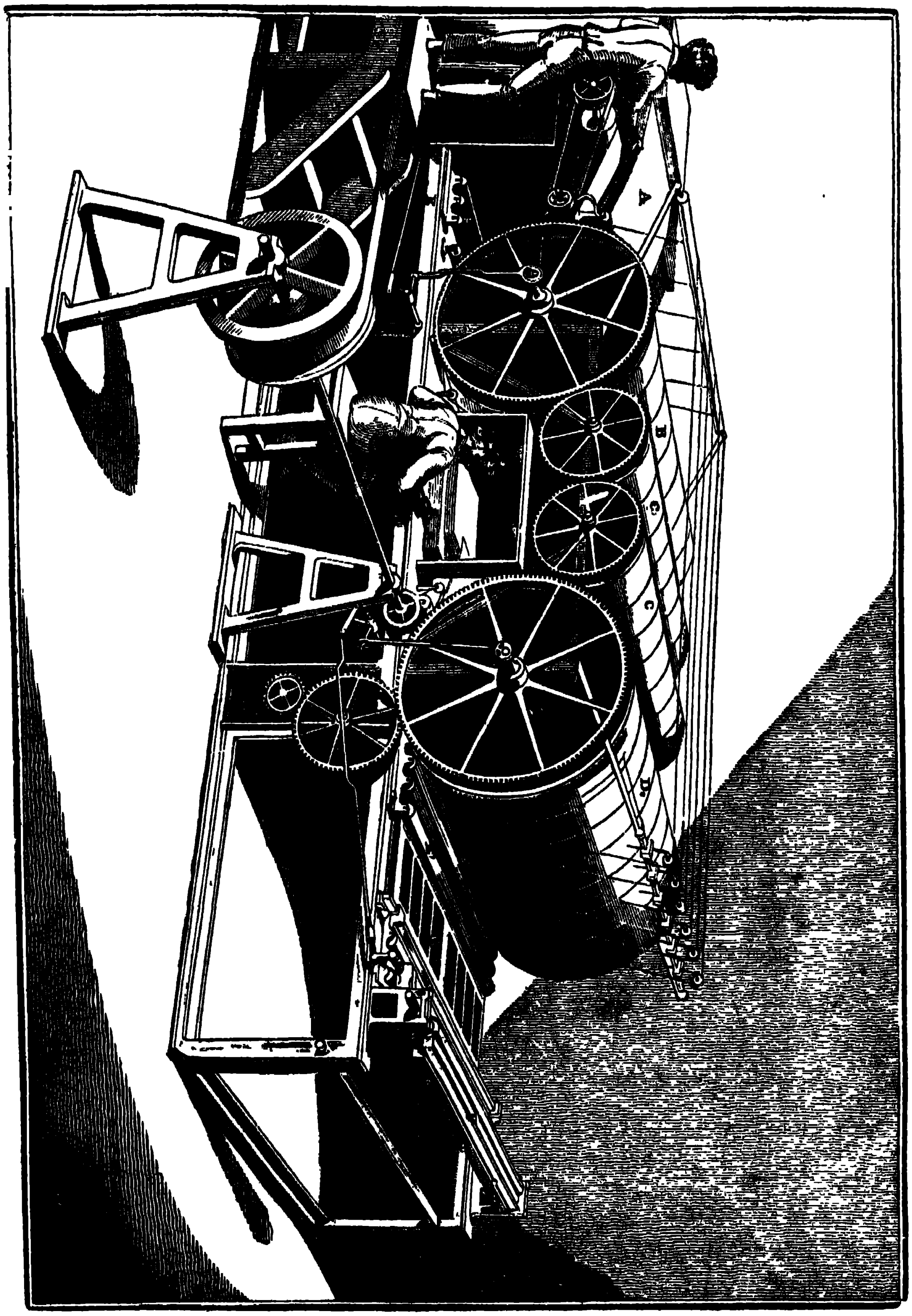


Ja.ˢ Lee ſc

M.ʳ Rutt's Printing Machine.



M.ʳ Stafford's Portable Preſs.



Perspective representation of Mr. B. Bensley's Printing Machine.

To face page 698.

English engineers.* It was not long before these gentlemen were requested to apply their inking apparatus to Messrs. Bensley's machine; and at one stroke, as it were, forty wheels were removed—so great was the simplification: and at the same time the defects of the former system of communicating the ink to the types were most effectually remedied. Massive and complicated as it was, yet as an immense expense had been incurred in its erection, Messrs. Bensley went on using their machine until the destruction of their establishment, by fire, in 1819. And even after the re-building of the premises, the machinery, which had been only partially damaged, was reinstated, and worked for some time. It has now, however, given place to two large and admirable machines built on the improved plan, which, when inspected by a judicious eye, can only create wonder at the heretofore circuitous manner adopted to attain ends so apparently within easy reach. The writer has no hesitation in stating, that the original machine contains upwards of one hundred wheels; whereas the new machine, with about ten wheels, accomplishes, in point of quantity, exactly the same object, with a marked advantage in regard to the quality of the printing. Another important point respecting the new machine is, that it occupies scarcely half the space of the original one.

" The printing machine, in its present state, appears susceptible of little improvement. It produces excellent work, and its movements are attended with certainty and despatch—the double, or perfecting, machine throwing off 800 to 1000 sheets, printed on both sides, within the hour, and the single machine delivering 1500 or 1600 done on one side: which, in cases where one forme of the types (as in newspapers) is ready to be worked off while the last side is preparing, is attended with the greatest advantage, since the rate of delivery thereby becomes doubled. The first is that by which our Gazette is printed, and the last described is that with which Mr. B. Bensley is now (and has for a considerable time been) printing the Morning Chronicle newspaper.

" Other leading daily newspapers are also wrought off by steam; as well as several publications of extensive circulation.

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* Executed by Mr. Dryden (a very clever and judicious engineer, who manages the extensive concern of Mr. Lloyd), under the instructions of Messrs. Applegath and Cowper.

Like almost every ingenious invention, this has no small portion of prejudice to encounter, and perhaps has been longer in forcing its way than many other schemes of real utility. The various advantages, however, which it holds forth have attracted the attention of several proprietors of the more extensive printing concerns, who have introduced it with benefit to the public—to whom, by means of this great reduction of labour, the productions of the press may be furnished at a reduced rate of charge.

" In the opposite engraving, a boy is represented as laying on A, the sheet of white paper. B, is the cylinder which prints the first side of the paper. C C, intermediate cylinders over which the paper travels to D, the cylinder which gives the final impression. E, the inking rollers under which the forme (*i. e.* the types) is in the act of passing. F, the reservoir of ink, from which the inking rollers are supplied. G, the forme, receiving its last inking before it goes under the printing cylinder. H, a sheet is seen just being delivered into the hands of another boy, whose business it is to keep the sheets, as they come out, in a heap. The lines at top of the machine represent the tapes, which run round the cylinders and secure the sheet."—*Lit. Gaz. Oct.* 26, 1822.

MR. RUTT'S MACHINE.—*Made by Napier.*

THIS machine is put in motion by hand labour: the opposite engraving represents the table at the back part of the machine, with the forme of type, just after a sheet has been printed, and the lad at the back in the act of taking it away; during the time the table is returning to the front part of the machine, the cylinder remains stationary, allowing time to lay a sheet of paper on it, and, by a corresponding arrangement, the table gives motion to the cylinder, and causes it to revolve; which, on passing again to the back part of the machine, performs the operations of inking and printing. From the principle of the motion introduced for the purpose of moving the table backward and forward, the man employed turns the handle always the same way. The bevel-wheels at the side of the machine, are for the purpose of giving motion to the ink-rollers, but, by disengaging the bevel-wheel on the upper end of the shaft from the bevel-wheel at the end of the ink-roller, the inking-rollers can be worked independently of the machine, for the purpose of getting them in order previously to the commencement of the day's work.

A MACHINE to work by hand was also invented by Mr. Brightly, printer, late of Bungay, in Suffolk; and made by the celebrated engineer Mr. Donkin. The inking and pressure of this machine was, like all the forementioned, by cylinders: but the movement of the formes was different. They were brought alternately under the action of the pressure and inking cylinders, by rising and falling, and passing over and under each other. The machine itself was a beautiful piece of finished mechanism; but I saw many defects in its operation of printing. I believe only one of these was ever made; and that has become, as Rowe Mores says of some of his letter-founders, a *nullibiquarian*.

MR. BACON'S MACHINE.

THE first principle of this machine is, that the type is to revolve upon a cylinder, in order to be printed;* but still the pages are to remain upon plane surfaces. This seeming contradiction is reconciled by the pages being secured, or imposed, in what Mr. Bacon called "pans," or printers would call galleys; and these would be fixed upon the surface of a cylinder to form a prismatic roller, such as a square, pentagon, hexagon, octagon, or other figure, and mounting this in a frame, with the means of turning it round upon its centres; a second roller, formed of segments of lesser circles, is applied in such a manner that its various surfaces will keep in contact with the surfaces of the types, and the machine being put in motion, the paper which is to be printed is laid upon a board, passed through, and receives the impression on one side. The types are inked by a cylinder of the usual composition, one of a series which is supplied from a ductor, or trough, fixed at the upper part of the machine, which is made to revolve upon excentric curves, so as to bring its surface in contact with the prisms of the main roller.

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* See *antè*, Mr. Nicholson's patent.

By this invention, the advantages of types upon cylinders are obtained, although imposed upon plain surfaces.

From this machine Mr. Bacon claims the merit of the discovery of printing by a circular movement. I believe he really was the inventor of the circular movement of the prismatic roller, but it is not possible that M. König, or Applegath and Cowper, could be indebted to his prisms for any part of the idea of printing by means of a plane and cylinders, or of forming plates of arcs of a circle, and fixed upon a cylinder. In fact, as said so often before, Nicholson's patent contains sufficient ideas for printing by these means, to destroy all pretensions to originality in any invention I have yet seen.

But this little machine was, indeed, a most beautiful piece of workmanship. The whole would stand upon an ordinary writing table, and it produced the sheets, at its exhibition, with great rapidity. But, that it could be introduced into a book-work house, or even a job-house, to execute all the variety of sizes of works and pages, was a thing which I could never believe: any practical printer might at once see the impracticability of applying the revolving cylinder to the general purposes of type printing. The exhibition at Mr. Donkin's factory was with pages of new type, as set up in successive order in the type-founder's pages, and the subsequent application to the work of a Bible or Prayer Book. So far the "pans" or galleys might be made to hold fast the type, spaces, and quadrats, by dint of tight screwing up; but the usual chance of variety of justifications, table work, and other contingencies of a compositor's work, which makes it sometimes a difficult matter even to raise one of the tight-locked-up quarters of an octavo forme from the stone, and drop it down, *all of a piece*, on to the press, would make it exceeding problematical whether the principle of gravitation might not act rather mischievously during the revolution of the "pans." One machine was to perform the work of eight presses; to cost a pretty round sum of money at first to Mr. Donkin; and to pay a seigniorage to Mr. Bacon of no trifling amount. But when all this was arranged, one machine would not answer for all kinds of work. That calculated for octavos would not do for twelves; nor would that proper for twelves do for quartos; nor one suited to quartos, for folios. I think I showed to the inventor that the various works actually laid on at six of my presses in one forenoon, would have required four of his machines to execute them; this was, therefore, a speculation not very likely for the London printers to enter into. To give a more minute account of this piece of typographical mechanism, or to incur the expense of an engraving is deemed equally unnecessary: the reader, therefore, who may be curious on the subject, is referred to Rees's Cyclopædia, Art. "Printing," 2nd col. of 2nd page of sheet 3 T 2, and plate III, Printing. Also, to the Cambridge University Press, where the only one of these machines that was, I believe, ever made, rests in peace, as not being found in any degree useful.

MR. ROBERT WINCH, *of Shoe-lane, in* 1820 *took out a Patent for certain Improvements on Machines or Presses, chiefly applicable to Printing.*

THESE were for the purpose of self-inking the types, supplying the paper, and printing the sheet at one operation. The apparatus consisted of a frame holding two tables or formes of letter, two pressing rollers, four inking rollers, and four frames for guiding the sheets of paper on to the pressing rollers to be printed. The motion of the rollers (which might be communicated by manual labour, or any other means) was to be reciprocal, like the motion of a horizontal mangle, and which, by one entire forward and backward traverse, was intended to print four sheets of paper. The bed, or basis of the machinery, was upon two inclined planes, meeting pyramidically in the middle, over which a roller, or shaft revolved, turned by a winch, or by any other contrivance, connected with a first mover. Chains passed round this centre roller, connected with the pressing rollers, one of which was made to roll up one of the inclined planes by the chains attached to its axis coiling round the centre roller, whilst the other, by its own gravity, rolled down the other inclined plane, by its connecting chains uncoiling. As these pressing rollers traversed, they caused the inking rollers, four in number, to pass over the types, having been previously supplied with ink from the ducts, distributers, and spreading boards, much in the usual manner. Thus, the two tables or formes of type were each twice inked, as above described, by the traversing of the rollers; and, as each pressing roller reached the extremity of its action, both at the middle and ends of the frame, a catch and lever caused the sheet of paper to be brought down in its frame to meet the pressing roller, which drew off the sheet from its frame, and caused it to lap itself round the periphery of the pressing roller, by which the sheet was carried forward on to the types, and received its impression. The further progress of the roller brought the paper up again, which was taken off by tapes, and was thence conveyed by hand to the pile of sheets before printed.

Upon comparing this apparatus with König's inventions, and that of Rutt, it would be difficult to discover in what part of the plan the present patentee founded his claim of novelty and originality.

This machine was advertised, exhibited, offered in shares! and finally disposed of somehow or somewhere; but the how or the where I could never find out. See more of this in London Journal of Arts and Sciences, No. 7, p. 25.

MESSRS. SAMUEL COOPER and WILLIAM MILLAR, of Fleet Street, London, are patentees and manufacturers of a machine bearing a title of "import high," "The British and Foreign Press, or Printing Machine;" with many parts common to all other printing machines; but with "variations" as endless and as confused as a patent specification can make them. Any person, however, having a tolerable knowledge of what other printing machines are, or ought to be, who will bestow close attention to the tedious and perplexing description in which all the parts, both old and new, are, without distinction, referred to by a confusion of several hundred large and small letters, and numerical figures, will soon perceive that this is not the *ne plus ultra* of printing machines. I can discover but little novelty in the essentials of the machine. The application of band wheels turned by chain, or catgut bands, instead of tooth and pinion wheels, prevents, certainly, much of the noise and vibration so objected to in other machines. I believe the points for register are also new in this machine, but I doubt their ever being found to answer the purpose of pointing; the tables on each side of the pressure cylinder are furnished with apparatus for this purpose; a lever connects the ends of the two bars which carry these points, so that, when the points at one table are raised, those at the other are depressed. Further particulars of this machine, with a plate, may be seen in the London Journal of Arts and Sciences for May, 1822.

Mr. Applegath has taken out a patent for improvements on his machine previously noticed; the first of which consists in supplying the printing ink to the forme by two sets of inking rollers, acting partly on one side of the pressing cylinder and partly on the other; by which means, as the forme passes to and fro it receives its supply of ink without being carried out to a considerable distance, as is the case in other printing machines, where the forme is inked entirely on one side of the pressing cylinder, and where it must be made to travel with considerable speed in order to pass entirely under the inking rollers. By this improvement, the forme traverses a shorter distance than usual, and hence, the number of impressions produced in any given time, may be increased in the same ratio as the traversing distance of the forme is diminished, by which a saving of time will be effected in the operation of printing.

" The second improvement consists in the adapting and combining two paper-feeders with a printing cylinder, which revolves and prints in one direction only.

" By this means, the printing cylinder can be supplied with more sheets of paper in any given time than when one feeder only is used; and thus advantage may be taken of the increased rate of printing, which is obtained by means of Mr. Applegath's first improvement."

These two points form the whole, and very material it appears to be, of this supplementary patent. See further description and plate in the London Journal of Arts and Sciences for August, 1822.

The number for July 1823 of the Journal to which I have been so much indebted, and but for which I should not, as yet, have known of this addition to printing machinery, contains the specification and an engraving, of a machine equally complicated, and possessing about as great a portion of originality as the British and Foreign machine.

Mr. Bold, of West Street, Bermondsey, is the inventor. I have not been informed whether a machine upon the principle as described in the specification has ever been made, and if one has, I should doubt, till I saw it at work, the possibility, from the combination of such a multitude of parts, of its being effectual for the purpose: in fact, it appears rather a combination of various parts of all other printing machines for effecting the same purpose in a more complex manner. The impression cylinders seem destined to effect their purpose by their weight alone, which would be immense, as they "may be made of solid cast iron, or cast hollow, and filled with lead." I see no provision for that essential part of printing called *perfecting*, except guide-rollers and tapes, and delivering-boards with register-lines marked thereon; and this, I am very certain, will never answer the purpose for well-printed book-work.

After having occupied so many pages of this chapter with descriptions which, after all, will be but of little use without engravings it would only tire the reader's patience to go through the detail of "certain axles, toothed-wheels, pinions, pullies, wedges, screws levers, and chains," by which the operations of printing are to be effected. The novelty of this patent appears to me to consist in the machine having two pressing cylinders;* three inking troughs, with a suitable number of "ductors and feeding rollers placed between, and at the ends of the tables;" horses to hold the paper, capable of being raised or lowered by means of racks, and thereby adjusted to the varying height required as the paper is worked off; with delivering boards supported by brackets, and turning on pivots; on to which boards, over rollers, separate sheets of paper are brought, and registered by lines marked thereon: the board is then let fall, and the sheet of paper suffered to hang from the roller until its edge is taken hold of by a small roller, and held against the periphery of the pressing cylinder; then, by a vibrating lever, the sheets of paper are, at the proper times, carried down to the pressing cylinder, and there held by guide-rollers and tapes. By the rotatory progress of the pressing cylinders, the sheets of paper are laid upon the surface of the types; and after receiving their impression, are conducted off, and raised from the tapes by an open frame or grating, whence they are taken by hand, and deposited in a heap at a distance from the engine. Again I refer to the Journal before-mentioned for an engraving and references.

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* A model was made some years ago by the ingenious De Heyne, which is now in the possession of Mr. Cogger, of a printing machine with *two plattens.* I always saw much merit in this machine, and really think, if the artist had lived and persevered, it might have been made a valuable piece of mechanism.

Sir William Congreve, whose active genius never sleeps, and who both invents himself, and improves upon the inventions of others, has added, to an already numerous list, an invention of a printing machine. It is true that the application of the invention has, at present, been limited to the purpose of printing in two colours the stamp-duty mark on banker's promissory notes, and the stamps for the excise, &c. for the prevention of forgery; the machinery which constitutes the general principle of the invention seems calculated to execute surface-printing in one colour only: the principal variation from the general detail of other machines appears to be that the part of the cylinder under the paper where the impression is to be made, must be raised above the rest of the surface of the cylinder, by a blanket covered either with leather or parchment, which may be termed the tympan sheet, so that this raised part only comes in contact with the plate or types in printing, while the remainder of the cylinder in retiring rolls over without touching it, and is followed by three inking rollers, which having received their ink from the distributing plate, apply a fresh charge of ink after every impression. The sheet, when printed, is discharged by a roller, and is then carried away by the endless tapes or cloth, and deposited upon a table placed for that purpose at the end of the machine.

Thus far the operations of the machine in its simplest form for printing in one colour, comprehends " the improved mode of laying on paper; of inking the rollers from the distributing surface;

and of inking the plates from the rollers. Also, the subsequent printing and throwing off the paper where one colour only is used."

The operation of printing in two colours may be performed by a similar machine when furnished with certain additions which will be explained. For the attainment of this object, however, plates must be constructed of a different kind to those usually employed for printing, these are intended to be *compound plates:* that is, formed of sundry pieces,* which pieces are to be separately inked with different colours, and afterwards put together for the purpose of producing one surface from which the impression is to be taken. These compound, or dissected plates, made of such pieces as exactly fit into the interstices of each other, are to be placed in the machine so as to receive the ink separately, and afterwards be brought together. Their surfaces may be engraven or cast with any ornamental design at the will of the artist, and the operation of printing from them in divers colours be effected as follows :—

Suppose two colours are employed: instead of the forme of types, block, or stereotype plate, a compound plate of the kind last described is placed in that situation. One part of this dissected plate is mounted upon a block, sliding in grooves in the under part of the stationary frame, and connected by rods, or levers, to an excentric wheel, which is thus made to rise up, and occupy the interstices of the upper plate, and fall down again into its original situation for the purpose of being inked. Three inking rollers and a feeding roller, with an ink reservoir and distributing surface, must be placed in a situation to act upon this part of the plate, and the rollers made to pass backwards and forwards with the sliding carriage. The excentric wheel is fixed upon the axle of the crank, which being grooved all round carries the roller as it revolves, and by means of its connection to the rods, or lever, causes the lower plate to rise and fall. Thus the two plates are separated for the purpose of inking, and are afterwards brought together, so as to coincide, and produce one surface. By these means, an impression in two colours is given to the paper, the operation of printing being the same as that described above for printing in one colour only.

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* Compound plates have long been applied to calico printing. In 1814, Mr. S. Marshall, of Streatham, Surry, obtained a medal from the Society of Arts for the invention. He attended the Committee of Mechanics, and "exhibited a block: it was a striped pattern, the stripes formed by slips of brass let into the wooden frame, certain parts of which slips can be made to rise to one level surface, or sink below it; so that if the black colour, for instance, is to be printed, the parts of the block which are to be used for another colour, are withdrawn within the block, and after the black impression is given, the parts to furnish the red colour are propelled forward, and the black withdrawn; the whole is easily effected by the turn of a screw. He also explained that by one block on this construction two different colours can be printed at one stroke."—*See the MS. Minutes of the Society of Arts for May*, 1814.

The patentee observes, " From the foregoing description it will be evident that when three or more colours are used, the same process will apply merely by having an additional tier, or tiers of inking rollers, distributing surfaces, and plates; the raised parts of the lower plates intended to print the third, fourth, or other last colours, passing, as before, through interstices in the different plates above it, all these plates being connected to the table by jointed braces similar to those of a compound parallel ruler; so that all the plates may be duly opened to receive their different coloured inks as the table descends by the bending of the joints of the standard, and that they may be closed by its straightening again."

As there are many parts of this apparatus common to other printing machines, it is necessary to observe, that the claim of originality consists in the mode of taking on the paper by the moveable carriage; of carrying it forward to be printed, and afterwards discharging it by the combined horizontal and rotatory motion of the printing cylinder as effected by the horizontal frame; and by the rising and falling racks, whether in printing one or more colours; in printing in two or more colours at one impression by the compound plates; and the mode of inking the same separately, with different colours, and of uniting them to print these different colours at one impression; and in distributing the ink by means of surfaces revolving upon axes at right angles to the plane on which the inking rollers move. And the patentee also claims a variation of the above machine so as to enable it to print by the back as well as by the forward motion of the carriage, thus performing double the work in the same time.

In this last-mentioned contrivance, there are to be two printing cylinders similar to the one above described, and moving on the one main carriage, but having two laying-on carriages, one to supply each cylinder at opposite ends of the machine; two sets of rising and falling racks; two sets of discharging bands; two revolving inking surfaces; two ink reservoirs and messenger rollers; and one set of inking rollers. Another variation of this printing press, when the formes or plates are at rest, and the printing cylinders in motion, is, that the two cylinders may be enabled to turn the paper from one to the other, and print on both sides of the sheet; in this case, however, the two formes must be at the extremities of the machine, and the two printing cylinders in the middle of it.

The specification concludes with these words: "the advantages of this system of printing machines when applied to the common printing in one colour, is, that, by having the forme stationary, and the printing cylinders in motion, those parts of the machine which are necessarily the heaviest are at rest, and those parts which are capable of being made the lightest are the parts moved; by which it is evident, not only that power is saved, and consequently increased rapidity obtained, but that the jar and wear and tear of the machine are much reduced. There is no doubt but that, by the double machine, forty impressions might be taken in a minute, without injury to the machine from its speed. When also this system of printing is applied to two colours, not only does this same advantage exist, but, by the apparatus here described, the most perfect and beautiful description of the register of colours ever devised is attainable."

This description, which I have extracted from the valuable Journal so often quoted, is therein more fully exemplified by an engraved plate answering to literal references throughout the description; and to which I here again refer the reader for further particulars.

Mr. Parkin, mentioned in p. 635 as the inventor and patentee of an inking apparatus, has a printing machine on hand, the progress of which I have watched with some interest; but as it has not yet got into actual work, I am not able either to give an accurate description, or to form a decisive opinion of its operation or merits. The general principle is still the same as all preceding it. The forme (it is only yet constructed as a single machine) is laid on the carriage, impelled by a reciprocating movement under a cylinder (which in this machine is unusually small) to receive the impression. The inking process is the only decisive novelty; being the adaptation to the machine of the apparatus referred to above; and so far as the ink being distributed on a table, or plane surface, may perhaps be said to interfere with the patent of Applegath and Cowper; however, I dare say it will never be contested, for I never yet saw a printing machine which did not, in some part or other, bear a strong similarity with other inventions or patents for the same purpose; and they have thus become so involved in each other's ideas, that an inquirer has only to investigate the various printing patents from the time of Nicholson, and he may overturn the exclusive right, as a whole, to any subsequent machine.

Mr. Spottiswoode, who has for some time had a steam engine and printing machine upon the construction first-mentioned in this chapter, has also (impelled by the same engine) a machine of a new construction in one material respect, which possesses, in my opinion, the principle by which better work may be effected than by any of the others, but not with such rapidity. The impression is by a platten, moving vertically; it has a self-acting tympan and frisket; and appeared to me doing at the rate of six or seven hundred per hour, one side, in excellent style of work.

MR. HANSARD'S PRINTING MACHINE.

"The Nap-Peer."

(FRONTISPIECE TO THIS WORK.)

MR. NAPIER's name has already occurred as the maker of machines for printing, in the instances of Rutt's, Dean's, and Treadwell's. I have now the satisfaction of bringing him forward on my own experience, as the inventor and maker of a machine which appears to me more likely to succeed in all its pretensions than any which has yet been offered to us; more particularly as it supersedes the necessity of steam power.

The motion of this machine is gained by two men turning a fly-wheel, which acts as the impelling power, and, although the same general principles prevail in this machine as in those already described (that is, as far as printing by cylinders and inking by rollers is concerned), yet, at the same time, it presents some novelties, which are of too great importance to be overlooked.

The first consists in a most ingenious contrivance for taking hold of the sheet from the supplying board, retaining it while receiving the first-side impression, and releasing it at the precise moment that the corresponding apparatus in the other cylinder executes the same movement for the impression of the reiteration. This beautiful mechanism is contained in the interior of the impression cylinders, which have openings along their circumference, through which the *gripers* perform their operations, and upon their action depends that important desideratum of press-work, ACCURATE REGISTER, or the backing of the pages on the paper, and this purpose is so fully effected, that from the many thousands of sheets which have passed through my machine, without the smallest deviation after register was made, I venture to call them, infallible.

Three (or more) pairs of these gripers working upon the same axis, are employed in each cylinder. At the moment the first, or white paper impression cylinder arrives at the proper position the upper limb of each pair having been previously opened to relieve the former sheet, and the boy having by this time laid another sheet to the appointed gauge, they again instantly close upon the advanced edge of the paper, without the velocity of the machine being in the least interrupted for that purpose; the sheet is by this means wrapped closely round the periphery of the cylinder, and there retained while it receives the impression on one side, after which, and upon the arrival of the cylinders, or rather the gripers contained in the cylinders, at their proper position (that is, where the cylinders present a tangent to each other), and whilst passing this point, the gripers contained in the second cylinder take hold of the sheet close by the others, whilst they at the same instant release their hold, and the sheet is, in like manner, conveyed round the second cylinder to be perfected or receive the impression on the other side: the instant this is effected the gripers again let go their hold, and the sheet, printed perfect, or on both sides, is discharged from the machine to the receiving board, by the action of pullies and two fine cords, so that one sheet is going into the machine and another coming out at the same instant.

Yet, notwithstanding the beauty and accuracy of this movement, the part, of all others, that reflects the highest credit upon the mechanical skill of the inventor is the rising and falling of the impression cylinders, for it is principally owing to this singular contrivance that he has been enabled so wonderfully to compress and simplify his machine as to bring it within the capability of so small a power to produce so much work; it is this which admits of the cylinders being made of the size represented, and placed so close to each other as to be enabled to turn the sheet, and perfect, without the intervention or assistance of any other cylinders, for no sooner has the first cylinder given its impression than it instantly rises up, to avoid coming in contact with either of the formes until it is again its turn to impress or print; while at the same instant the second cylinder descends for the purpose of giving the second impression. Thus the cylinders are alternately rising and falling during the whole progress of working; and it may be curious to observe that when down they are firmly held in their positions while they give the impression, and until their time arrives to be disengaged, and rise again; these cylinders are easily adjusted to any required degree of pressure, and that even without interrupting the progress of the machine; and the inking apparatus, of which there is a set for either forme, is provided with various important contrivances which fully answer every purpose required in that indispensable part of the operation of printing.

My machine has had a trial of six months:* its ordinary speed is, according to the required quality of the work, at an average of two thousand impressions, or one thousand perfected sheets per hour, but is capable, by exertion, of doing much more; the speed, in fact, is only limited by the time necessary for the boy to lay the white paper to the gauge, or mark, and the power which the men are capable of exerting who turn the wheel, the labour of which is considerable if followed up at more than one thousand per hour. I have, therefore, three men to turn, in order that each one may be alternately at rest, or sitting to receive and lay even the printed sheets as shot from the cylinder; thus every man of those three has twenty-minutes' relief in each hour. Another man of more intelligence acts as foreman, or overlooker, whose business it is to attend generally to the machine and workers, place the paper by tokens on the supplying board, and take away the printed sheets from the other end: a little boy performs the business of the layer-on, but which requires very considerable precision, as the rapidity of the machine will be interrupted if his attention is in the least degree diverted; if any corner should be doubled, or otherwise require particular time for placing, he will be obliged either to throw it to one side, or to cry out "halt," and the machine must stop; it is, therefore, very necessary that the paper should previously have been turned and pressed and laid very even; should a sheet escape by being laid improperly for the gripers, it is liable, instead of being carried round the cylinders, to be dropped upon the forme, from whence it will be conveyed to the inking rollers, and, from its adhesion to the substance and the ink, will take some time in being stripped off, and some care of the overlooker, to get the roller properly covered with ink to proceed as before, which is simply done by passing through the machine two or three waste sheets, till the roller has regained its proper degree of colour. I have a power in my machine of adding an additional roller to the inking apparatus at each end, which I apply when particularly good work and fine ink are required; but this causes a great increase in the labour.

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* (November, 1824.)

This machine occupies but very little space, about 5 feet by 10, or not more square feet than a common press, bank, and ink-stand; but, although thus compact, it contains a vast quantity of extremely curious mechanism, and would require a very lengthened description to give a perfect understanding of its various parts and movements, but it is hoped that the distinct and accurate perspective view in the front of this work, will serve to make up that which is deficient here.

Mr. Napier has also constructed several machines upon the same general principle as mine, for newspaper-work; to print from only one forme, and that either with one or two cylinders; but these not requiring to reverse the sheet have none of the mechanism for perfecting; the paper is taken from the supplying board by an apparatus called the feeding bar, and conveyed round the cylinders by tapes; those with two cylinders possess double the speed of those with one; for, having the inking apparatus in the centre, the type is inked and an impression is taken both in the motion to and fro, being supplied with paper at both ends from boards at the top of the machine, which, when printed, is discharged underneath the supplying boards; of course it is calculated that one forme shall be ready and worked before the other, and the machine at liberty for perfecting, otherwise a second machine must be employed. The Morning Post, the News, &c. are printed by the single cylindrical machine, called the Imperial Printing Machine. The Courier, the British Traveller, &c. are printed by the two cylinders, called the Double Imperial Printing Machine; of the speed of these two machines, as compared with my own, experience does not enable me to speak; but I have reason to believe that they give ample satisfaction to those by whom they are employed; for the Proprietors of the News, Sunday-paper, in an article addressed to their readers, December 8th, 1822, publicly declare, " that now they are enabled, without any extra exertion, to work off from 1200 to 1500 in the hour:" and the Courier of November 14th, 1823, says, " We think it right to announce to our readers, that the Courier is now printed by a machine of such extraordinary mechanical power, that it is capable of throwing off considerably above *two thousand* papers per hour; it has, indeed, on one occasion, produced at the rate of 2880 impressions within the hour." Both of these speak of the single machine, and reckon by one side only; so that in each case, a second machine must be employed to perfect, or print on the other side. The power of one man is sufficient to turn these single cylinder machines; but two are kept, who relieve each other at short intervals.

After all, in the great variety of forms, and qualities of work passing through any printing-office, recourse must still be had to the aid of good manual presses and experienced pressmen. The serious expense of a printing-machine* can only be repaid by executing an extraordinary quantity of work in a much less portion of time than that usually occupied for the same work done by ordinary means. As, therefore, the time consumed in laying-on, or making ready a forme, must be valuable in proportion to the number of sheets which might be struck off in that time; so, frequent repetition of the previous process for short numbers would counterbalance all gains arising from the speed in working. Machine printing will therefore be only applicable to works of extensive sale. But those of which limited numbers are printed; those also requiring a superior description of press-work, with fine ink; fine, and large paper, copies, with alterations of margin; and many other peculiar circumstances which are continually occurring, will always require a judicious choice of men and materials, for the old mode of working, varied as circumstances may at the moment require. Half-sheet work, or jobs printed on one side only, are either impracticable or disadvantageous at a perfecting machine.

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* Between six and seven hundred pounds.

ON PRINTING INK.

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CHAPTER VIII.

First Improvements in Ink, by Baskerville, in 1760—*Mr. Bulmer,* 1790—*First Manufacture for Sale—Mr. Blackwell—Mr. Thomas Martin—Martin and Grafton of Birmingham—Secrets of Ink-making—The Black—Qualifications of Good Ink—Receipt for making Baskerville's Ink—Of the Varnish; Dangerous Process—Receipts for Black Ink and Red Ink—French mode of making the Varnish, Blacks, and mixing for Ink—Mr. Savage's Receipt—Coloured Inks—Observations on the Colour to be kept up—Specimens of Qualities—Mr. Griffiths, and other Makers.*

IN speaking of this preparation, so essential, as regards its quality, to good printing, it is my intention to go somewhat more into detail than any of those who have hitherto written on the subject of printing. Notwithstanding all the efforts which have been made in this country, there is still a wide field open for further improvement in this article, and though many makers have from time to time started into notice, none of them have been hitherto fortunate enough to attain perfection.

Mr. Beale Blackwell was the first maker of ink of any note in this country; he established considerable works for the supply of the trade, and for a long time kept all competitors at a distance:* at length Messrs. Martin and Co. erected their works at Birmingham, and it is but justice to those gentlemen to say, they have been the means of making greater improvements in the manufacture than any who preceded them. The writer of this has tried most of the inks which have been recommended to the trade, from a desire of encouraging competition and finding a better article, but has constantly found those trials only confirmatory of his opinion in favour of that supplied by the firm just mentioned, and is perfectly willing to let his credit, in his profession, rest upon the use of their ink, in competition with any ink, or improved ink, made in this kingdom.

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* The manufactory established by Mr. Blackwell (of whom see p. 283) is now carried on by Mr. Colvil, who was in partnership with him for some years.

In the address they circulated in January 1817, they observe:—"The Art of Printing having, within a few years, arrived at a point of excellence unattempted at any former period, it may seem surprising that so essential an article to its beauty as Printing Ink should have so long remained in an unimproved state. It is, however, indisputably true, that this preparation has been found in numerous instances very defective; the ink frequently, from its tenacity, tearing off the fibre of the paper, and thus causing picks; at other times not drying properly; and still more frequently, from the impurities and imperfect combination of the oil and black, running on the paper and turning it of a yellow colour, thus destroying the excellency of the work, which, in every other respect, may have been executed with the greatest care.

"In the hope of avoiding these defects, which it is utterly impossible the printer should foresee, and of producing an ink, that, while it combines beauty and richness of colour, is calculated to bring off a clear impression from the finest shades of wood engraving, we have had recourse to numerous experiments, many of which have been of an expensive and troublesome nature. From the facility we possessed (being printers) of trying the products of these experiments, we were the better able to form a decided judgment as to the results—that we have succeeded, its extensive use must now fully evince," &c.

These observations prove them to have a knowledge of the requisites of the art they are practising, and though they have not hitherto attained the absolute perfection to be desired, still they may be fairly said to stand foremost on the list of competitors.

Few printers, of any eminence, in this country attempt to be entire makers of their own ink,* the improvement of the manufacturer's ink being the most that has been attempted by any printer of much practice, with the exception of Mr. Bulmer, and this has been effected by re-grinding, or mixing, the article with such additions as they thought might give a better colour, or a tint more congenial with their taste. I do not pretend to be possessed of their secrets—I never could perceive any such difference in that quality of their work as to induce me to bestow a single hour in trying experiments to find them out: nor, if I knew them, would I practise them. I believe, some few years ago, the article manufactured for sale was at so low an ebb as to make it desirable to try any means of improvement: the matter is now reversed, and if I wanted ink to have the purpleish blush which has by some been fancied as adding beauty to printing, I could have it immediately made to my mind. But that is not my idea of fine printing: black, as perfect as blackness can be, is, in my judgment, the true criterion of good ink. The lamp-black of commerce is too coarse and impure to effect this, as the manufacture has, for a long time, been confined to individuals who have had more profitable speculations in view, and who only made the article to get rid of the refuse substances lying about their works, without any attention to quality or cleanness, quantity being the principal object of those who are thus engaged.

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* Even those who make their own ink are glad to obtain the black of the manufacture now spoken of.

Black, in this impure state, for a long time satisfied the makers of printing ink, which, during a period of nearly 200 years, received little or no further improvement, and it was not until the days of the celebrated Baskerville, as mentioned in a former part of this work, that any attention was turned to this most essential article. His scrutinising eye was always on the search after improvement, and his mind, quick as his vision, ready to mature the first idea. It was reserved for him to discover, after such a lapse of time, a superior kind of black for the purpose required, and to this success may be attributed, in a great measure, the superiority of his printing, which is still justly admired, even in the present further improved state of the art. His success gave a stimulus of rivalry to others in the trade, and a few, out of many, attempts, were in course of time partially successful.* Some added indigo or prussian blue to the common ink of the makers, and thus considerably improved their colour; but the difficulty of working inks containing these pigments, and the impossibility of bringing off clear impressions from wood cuts or small type, without very considerable labour and great loss of time, were such drawbacks on the improvement as to render it almost useless. Other printers procured samples of black from the continent, and, in some few instances, succeeded in finding a better colour; but the imperfect knowledge possessed by the printer of the entire art was always a stumbling block in these experiments too difficult to be entirely overcome, and though he might succeed in one point, a fresh obstacle generally arose to thwart him in another.

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* That Mr. Blackwell succeeded is clearly shown by the works I have mentioned as being printed by Mr. Ritchie. See p. 610.

Thus the discovery of Baskerville, of about the year 1760, lay dormant from the time of his death till 1790, when, through Mr. Robert Martin of Birmingham, his apprentice, and afterwards his foreman, a considerable quantity of this fine black, which had been collecting, for a length of time, from the glass-pinchers' and solderers' lamps, was bought by him, at an almost unlimited price, and was supplied to Mr. Bulmer for his experiments in fine printing. But the difficulty of obtaining any regular supply by these means, and the adulterations practised by the workmen when they found a demand for the article, induced Mr. Bulmer to erect an apparatus for the purpose of making it, for his own use; and he succeeded in producing a very superior black. The slow process, however, by which it was collected, and the unpleasantness of the business, rendered it impossible to supply any considerable quantity of ink even by this mode, without going more largely into such a concern than he ever intended, and interfering with the object he had most at heart, the improvement of his own profession: quality, however, being the sole object of Mr. Bulmer, and having made sufficient to supply his own consumption, he may be said to have succeeded to the extent of his wishes.

I have lately had an opportunity of examining, with most particular attention, the effect, at this day, of the ink made by Mr. Bulmer for his Shakespeare and Milton, printed in the years 1792 to 1801; and also of a small work less known, but more exquisite perhaps than either of the above, namely, *Forster's Anacreontis Odaria*, 1802.* The most anxious scrutiny cannot, in these works, find the least appearance of failure of that beautiful velvet richness of colour which the ink originally possessed. Of the whole nine volumes of his Shakespeare, from the first volume to the last, being as many years in hand, the same harmony of tint and richness of colour prevail as if the ink had all been made at one time, and the last sheet inked by the same hand in the same hour as the first; this single work probably comprises more pages than all that Bodoni ever printed.

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* Ornamented with vignettes after designs by Miss Bacon (now Mrs. Forster). A few copies were taken off on French paper; and certainly nothing ever excelled the beauty and clearness of these impressions. While regaling myself by an inspection of this master-piece of press-work, I really lamented

But the finest criterion by which to judge of the perfection of ink and work is offered in the volumes printed by Mr. Bulmer of DIBDIN'S DECAMERON: the numerous wood engravings in which the ground is an entire black,[*] and others with parts of the figures black on white ground,[†] exhibit such an evenness and intensity of colour, as nothing but ink of the most perfect compound for the purpose could effect; much, of course, must have been owing to the aid of good and congenial quality in the paper, and ensured in effect by the experience and skill which Mr. Bulmer was so competent to impart to his workmen; and that a great deal must have depended upon, and been effected by, the two last-named requisites, is very apparent from his being able to produce the same effect in ink of another colour, namely, red.[‡] Yet every one, judge or no judge of typography, must at once see the extreme difficulty of covering so large a surface with entire colour, while the small type, on the same page, has no surcharge of colour, but is worked equally clear with other pages consisting wholly of type. The same perfection of printing has been continued in the Bibliotheca Spenceriana, and Mr. Dibdin's Typographical Tour, although I must venture the opinion that the Spenceriana is somewhat inferior to the others; but which may have arisen, if the ink was the same, from the paper having had a *dash* of those *improvements* in paper-making which I have so often been hinting at—and something more from that mixture of type of various sizes, and that want of strict conformity of proportions and fashion, which I have mentioned as a great characteristic of beauty in the works of the continental printers.[§]

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that Mr. Bulmer had placed the usual Arabic printing figures at the head of each page as folios; for, had they been absent, I could have fancied the Greek type to have been copper plate of exquisite workmanship.

[*] See vol. iii. pp. 14, 27, 37, &c. [†] Ibid. 42, 43. [‡] Ibid. pp. 16, 17, 50.

[§] See Introduction, p. 316.

Every printer may easily conceive that the business of ink-making must require very great attention, and can never be advantageously carried on where the mind is divided between two distinct and laborious pursuits; if, in a few instances, the desired object has been partially attained, yet it has always been at an expense bearing hard upon the individual, and only to be repaid by printing works of unlimited cost.

About this period the rage for ink-making became common among the printers, from the success of Mr. Bulmer; this may be easily accounted for by the total neglect of the individuals who then had the trade in their hands, and who, up to this time, never attempted to make any advance towards improvement, but retained the same apathy and indifference as if their own art had been perfect; they rather threw obstacles in the way of others than endeavoured themselves to surmount the acknowledged defects. This negligence gave rise to considerable dissatisfaction between the master-printers and ink-manufacturers; and thus an extensive field was thrown open for competition, and several new ink-makers started at a time when they were almost certain of encouragement.

Among these competitors, Mr. Thomas Martin, nephew of Mr. Robert Martin, above-mentioned, a printer of Birmingham, appears to have been the most successful. His early knowledge of the trade, gathered from his uncle, gave him an advantage which none of his competitors possessed, and he soon produced an ink of very superior colour. This was only effected by his following up the system of Mr. Bulmer and making his own black, which he did for a considerable time from fine lamp oil, the smoke being collected in a variety of glazed earthen vessels made for the purpose and connected together, communicating at last with one common receiver. Still the slow process of producing it by this method, together with the increasing demand for fine inks, induced him to go to very great expense in experiments and in erecting various apparatus for the manufacture. In pursuing these labours he discovered several modes of making black, of a quality superior to any in the market, from materials not before used: his success thus far proved the principal means of introducing him to the trade; and the still-increasing demand for fine inks has since that time induced him to erect very extensive works for the making of fine black upon new and improved principles, on one of which he, in conjunction with his partner, Mr. Grafton, has recently obtained a patent; for the particulars of which see Repertory of Arts, vol. 43, p. 257.

Of the fine black manufactured by them I have now some before me, and have no hesitation in pronouncing it the finest smoke-black made in this country. I understand it is produced from coal gas, burnt in a peculiar way, and the smoke collected in a similar manner as for the spirit-black described in their patent. The complex nature of this apparatus, and the great extent of building requisite to carry on the same, render it impossible to give, by verbal description alone, any clear idea of this manufacture, nor indeed would it be right to lay open to the world an invention which has cost so much expense, time, and labour to perfect.

From these persevering exertions in the pursuit of this art, I am induced to hope the profession will be supplied with superior inks, calculated for the various purposes of the press, combining beauty and richness of colour with clearness of impression, and freedom of working with quickness of drying, in quality so much improved, and at prices so much reduced, as totally to obviate the necessity of master-printers employing a portion of their valuable time, and risking the safety of their property, in the pursuit of an art that but few can attain, and if attained, where they have so much to risk and so little to gain.

In throwing out these observations to the trade, which I have been induced to do from motives of general utility, I would not be understood as wishing to damp the ardour of the speculative mind, or crush the spirit of inquiry in the pursuit of perfection; but I would suggest the advantages which might be obtained, if the printer and ink-maker would go hand in hand in their research after improvement, instead of endeavouring to render every part of their respective knowledge mysterious and undefined. There is likewise a second and more powerful motive for this union, as it would tend to do away that system of bribery and corrupt influence carried on between the ink-maker and the journeymen, and now become so prevalent in most printing-offices as to amount to an actual demand of a five, and frequently of a seven and a half, per cent on the consumption. This growing evil requires the immediate attention of the trade, as all must be aware no manufacturer can sacrifice so large a portion of his fair profits, and, consequently, that he must materially reduce the quality of the article manufactured, to meet this imposition.

Having said thus much of the progress and improvement of the art, it only remains to make some general observations on the article itself and its proper application.

Good ink requires the possession of a variety of qualities, some of which seem to be at variance with each other. By the fineness of the black, the softness of the varnish, and the power of the mill in triturating and mixing the ingredients, it should be made perfectly impalpable. To the eye it should appear of a clear black tint; not glaring or glossy, nor yet so mellow as to want an agreeable tone and strength of colour. The finer sorts should be made of that degree of stiffness, that the same inequalities of surface, even to fine pointed hillocks, and twisted forms, will be found to have retained their shapes, if the can had not been opened for twelve months after any part was taken away by the ink-slice; neither must it form any film or skin, or suffer any decomposition of its parts. Yet it must not have any tendency to dry while kept in the can or cask, or be too cohesive for distributing with tolerable ease on the balls or rollers. It must have such an affinity to the paper, as to adhere firmly to the surface from the moment it receives the impression; but it must not possess such tenacity as to remain upon the face of the type, and tear off the fibre of the paper, which would then be gathered upon the balls or rollers, and again conveyed to the type, filling up the face, and casting little blots, technically called picks, upon the subsequently printed sheets; but much of this must depend upon the texture of the paper.*

Various receipts have at different times been published on this subject, but none that I have hitherto seen seem calculated to produce the effect; it would be therefore a folly to insert them here: the one I shall introduce, which has never before been published, has been given me as the mode practised by Mr. Baskerville, which a careful examination of his printing will fully prove to have stood the test of time.

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* I would here wish the printer to notice particularly this point, as inks are too frequently complained of as being foul and gritty, and the ink-maker condemned, when it is wholly caused by the tenderness of bleached and cotton paper, and the earthy particles used in its manufacture.

He took of the finest and oldest linseed oil* three gallons, this was put into a vessel capable of holding four times the quantity, and boiled with a long-continued fire till it acquired a certain thickness or tenacity, according to the quality of the work it was intended to print, and which was judged of by putting small quantities upon a stone to cool, and then taking it up between the finger and thumb; on opening which, if it drew into a thread an inch long or more, it was considered sufficiently boiled. This mode of boiling can only be acquired by long practice, and requires particular skill and care in the person who superintends the operation, as, for want of this, the most serious consequences may occur, and have very frequently occurred.† The oil thus prepared was suffered to cool, and had then a small quantity of black or amber rosin dissolved in it, after which it was allowed some months to subside; it was then mixed with the fine black, before named, to a proper thickness, and ground for use.

This method, with very little modification, I have every reason to suppose, was pursued by Mr. Bulmer in the making of his ink for the Shakspeare and some other fine works printed in the early part of his practice: and I have it from the best authority, that when the boiling of the oil is properly managed and the black well mixed and ground, no finer or better working ink can be made.*

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* The linseed oil generally in the market, is totally unfit for the purpose of ink-making, being too frequently mixed with seeds of an inferior, drying, quality, or expressed from those which are damaged or unripe, and very often overheated in the steam-kettles in order to force out an additional quantity of oil; this excess of heat invariably causes a large portion of the mucilage to combine with the oil, and till that has subsided it is unfit for use. This mucilaginous combination is, in fact, more or less in all seed oils, which renders it necessary they should stand a very considerable time to subside, before being converted into varnish, which can only be regulated according to the quality of the oil, but in no case should it be used before twelve months old, and if kept longer will be considerably improved: good oil may, in some measure, be known by its appearance, the best being of a pale straw colour. This varnish, after being brought to its proper consistence, requires to stand for at least two months, that the decomposed mucilage and other matter may subside to the bottom, it will then be fit for use. Some makers add to their varnishes boiled turpentine; others rosin, and, not unfrequently, soap; these are useful in some instances, particularly in rendering the type easier to be cleaned, as, without something of this kind, the ink will be difficult to wash off, but only in this particular can they be of service.

† If flame once communicates to the oil in this state, nothing can extinguish it but instantly closing the pot or vessel, so that no air can draw in to feed the flame. One of the most tremendous fires that happened in this metropolis a few years since was thus occasioned; no making of varnish should ever be attempted within the walls of a printing-office.

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* In Rees's Encyclopædia is given the following receipt for making ink:—

"*For Black Ink.*—A hundred pounds of nut or linseed oil, being reduced, by boiling, to the consistence of a syrup, are cleansed and purified by throwing into them two pounds of coarse bread, and about a dozen onions. Nut oil is supposed to be the best, and is accordingly preferred for the black ink, though the darker colour which it acquires from the fire makes it less fit for the red. This oil is boiled in an iron pot, capable of holding at least half as much more, because it swells very much; when it boils it is kept stirring with an iron ladle; and if it does not itself take flame, it is kindled with a piece of lighted paper, or burning wood, in order to increase its consistence and tenacity, and to diminish its greasiness. The oil is suffered to burn for half an hour or more; and the flame being then extinguished by covering the vessel close, the boiling is afterwards continued, with a gentle heat, till the oil appears of a proper consistence; in which state it is called varnish; of which there should be two kinds, one more and another less boiled; or a thicker and thinner, to be used for different purposes, and in different weathers. The oil is said to lose in being boiled into thick varnish from a tenth to an eighth part of its weight; but different oils, and perhaps the same oil in different states, differ in this respect. The design of adding the bread and onions is more effectually to destroy the greasiness; but Dr. Lewis doubts, whether additions of this kind are of much use. They then boil thirty or thirty-five pounds of turpentine apart, till such time as they find, upon its cooling on paper, that it breaks clean, like glass, without pulverizing; for if it pulverize easily, it is a sign it is burnt. The oil and turpentine being thus prepared, the first is gently poured, half cold, into the latter; and the two stirred together with a stick till they be well mixed: after which the boiling is repeated and the composition is set by, to be used occasionally. The turpentine is used in order to give a greater body to the varnish, and to increase its drying quality; and with some artists, litharge has in this intention been a secret. M. le Breton, in the Encyclopédie, observes, that when very old oil is used, neither turpentine nor litharge are needful; but that when the oil is new, some turpentine ought to be employed, because, without it, the smearing of the paper, by the spreading or coming off of the ink, cannot be avoided; and he adds, that it is much more eligible to use old oil than to have recourse to this correction of the new: both turpentine and litharge, particularly the last, making the mixture adhere so firmly to the types, that it is scarcely to be got entirely off by the ley, whence the eye of the letter is soon clogged up.

"Now to proceed to make ink, they take a quantity of this mixture, and add to it a certain quantity of lamp-black, working it up with a kind of

Mr. Savage, in his work on Decorative Printing, recently published, would seem to contradict this theory, as he insinuates that

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wooden mallet, or brayer, till the whole be incorporated, and reduced into a kind of pulp; which is the ink for use.

"Where, note, that its thickness or strength is always to be proportioned to that of the paper, and the warmth of the weather; strong paper and hot weather, requiring strong ink: and that the strength or weakness of the ink depends on the greater or the less degree of coction of the varnish. According to M. le Breton, two ounces and a half of the lamp-black are sufficient for sixteen ounces of the varnish.—*Lewis's Commerce of Arts*, p. 371.

"*For Red Ink*, they use the same materials as for black, excepting only, that instead of lamp-black, they add a proper quantity of vermilion. Some hold, that, by mixing and incorporating the bigness of a nut of fish-glue, or brandy, or the white of an egg, with the ink, the vermilion acquires a greater lustre."

In the French "Printer's Manual" much more precise directions are given for the general manufacture of ink than I have any where else met with; embracing the various processes of making the varnish and the black; describing minutely the apparatus for obtaining the latter; and the various accidents, with means of avoiding them, to which the various processes for preparing the former are liable: these descriptions appear altogether so useful for situations where a regular manufacturer is not at hand, that I am induced to add them, in the original, to this chapter; for a translation would be exceedingly difficult, owing to the numerous technical terms employed, and the peculiar names given in the designation of some articles, for which no corresponding words or phrases are used in the English language.

I certainly do not calculate upon such a description of the process of ink-making being of so much utility as it may be of curiosity, to printers in general, or perhaps to any English printer; but to others situated where they cannot have immediate communication with a metropolis, or trading town, where the article may be procured ready made, or the articles of which it is compounded, he may be obliged to unite also the trades of varnish-maker, black-maker turpentine-maker, and so on: and in such a case, the French terms might be more easily comprehended than if rendered by English phrases and technicalities.

"*De la manière de faire le Vernis pour la composition de l'Encre d'Imprimerie.*

"L'Encre d'imprimerie est composée de deux choses; savoir, du vernis et du noir de fumée. Pour faire ce vernis, il faut prendre un pot de fer ou de cuivre; il y en a qui en font faire exprès, large par le bas et étroit par le haut, avec des anses à côté, pour y passer un bâton à travers afin de le transporter d'un lieu à l'autre. Le couvercle de ce pot doit être bien juste, afin d'étouffer le feu lorsqu'il prend à l'huile qui est dedans.

no ink can be depended upon where oil forms the base of the varnish; he has, in consequence, pointed out a new mode of making ink, entirely divested of oil; namely,

Balsam Capivi	9 oz.
Best Lamp-Black	3
Prussian Blue	1½
Indian Red	¾
Turpentine Soap dried	3

"On doit remplir ledit pot un peu plus d'à moitié d'huile; car si on en mettait davantage, il serait à craindre qu'elle ne versât dans le feu, parce que l'huile s'élève toujours à mesure qu'elle s'échauffe; c'est à quoi il faut faire attention, de crainte qu'il n'arrive quelque accident, comme nous le dirons ci-après.

"Il n'y a que deux sortes d'huiles qui soient propres à faire le vernis; savoir, l'huile de lin, et celle de noix; quant aux autres, elles ne valent rien, attendu qu'elles sont trop grasses; ce qui fait que l'impression macule, quand on vient à la battre, et jaunit à mesure qu'elle vieillit; cependant on se servait autrefois de l'huile de navette et de chanvre, mais c'était dans des imprimeries où on ne fesait que des Almanachs et d'autres semblables brochures, dont on ne se souciat point que l'impression fût belle, pour la donner à bas prix.

"Ayant ainsi rempli le pot de la quantité d'huile que nous venons de dire, on y fait du feu clair, de même que dessous un pot dans lequel on fait la soupe; jusqu'à ce que l'huile soit bien échauffée, et que le feu soit en état d'y prendre; c'est-à-dire, pendant deux heures, ou environ.

"Dans le commencement on y jette une croûte de pain, afin de dégraisser l'huile, laquelle on ne doit ôter qu'après qu'elle est convertie en charbon; et sitôt qu'elle est ôtée, on doit faire cuire l'huile à petit feu encore l'espace de trois heures ou environ, après lequel temps, pour savoir si l'huile est assez cuite, on trempe une cuiller de fer dans l'huile, et on en laisse tomber quelques gouttes sur une ardoise ou tuile; et sitôt que ces gouttes sont refroidies, on touche cette huile avec les doigts; si elle est gluante et qu'elle tire à peu près comme de la faible glu, ou comme si c'était de petits filandres qui s'allongent à mesure qu'on ouvre les doigts, c'est une marque évidente qu'elle est assez cuite, et qu'elle change son nom d'huile en celui de vernis: si elle ne fait point cet effet, on la doit laisser sur le feu, jusqu'à ce qu'on voie les signes susdits.

"Le vernis étant ainsi fait, on le laisse refroidir dans le même pot, jusqu'au lendemain; ensuite on le verse dans quelqu'autre vaisseau, pour en prendre lorsqu'on veut faire de l'encre.

"Comme il pourrait arriver que le vernis serait trop fort pour faire l'encre en hiver, on doit, par précaution, en tirer un pot, plus ou moins, selon le besoin, une heure après qu'on aura tiré la croûte de pain, afin de pouvoir

These ingredients, when ground, seem to have formed an ink of good colour, as exhibited in the body of his work; but on a care-

affaiblir celui qui serait trop fort ; et on se sert aussi de celui-ci pour imprimer les images en taille-douce.

“ On doit cependant remarquer que cette huile qu'on tire doit être passablement cuite ; car si elle ne l'était point, elle jaunirait l'impression, la rendrait pâteuse, et la ferait beaucoup décharger à la retiration ; c'est ce dont on s'appercevra, en cas que les balles ne tirent point ; et à quoi il faut faire attention.

“ Comme il peut arriver que le feu pourrait prendre dans le pot où est l'huile, principalement lorsqu'elle commence à se convertir en vernis, il faut prendre les précautions suivantes :

“ Sitôt qu'on aura mis le feu dessous le pot où est l'huile, on doit prendre des emballures qui sont ordinairement de grosse toile, et les tremper dans l'eau ; ensuite les plier en quatre ou cinq doubles, les bien tordre, et les laisser égoutter, afin que quand on voudra s'en servir, il ne tombe point d'eau dans l'huile ; car cela serait capable de la faire élever, et en danger de ne pouvoir éteindre le feu qui serait dans l'huile.

“ On doit avoir un bâton tout prêt pour transporter le pot, en cas que le feu vienne à y prendre, afin de ne point chercher après les choses nécessaires quand cela arrive, de crainte que le feu ne vint à augmenter si fort qu'on ne sût plus comment l'éteindre.

“ Quand on voit que l'huile s'échauffe beaucoup et qu'elle veut sortir hors du pot, ou que le feu est dedans, on doit incontinent couvrir le pot de son couvercle, passer le bâton à travers les anses, et le transporter dans la cour ; et si c'est dans un jardin qu'on fait bouillir cette huile, on le transportera un peu éloigné du feu, en observant de le porter de manière que la flamme qui sortirait par quelque fente du couvercle, n'incommode aucun de ceux qui le portent. On doit le poser tout doucement à terre de crainte de le renverser.

“ Lorsqu'on aura ainsi posé le pot par terre dans une place bien unie, on doit ôter le couvercle avec un bâton, de crainte de se brûler par la flamme, et laisser brûler hardiment l'huile ; mais si elle voulait sortir hors du pot, on doit de suite remettre le couvercle dessus ; si cela ne suffit point pour l'éteindre on peut jetter les emballures dessus, de manière qu'il ne puisse point y avoir d'air, et le laisser ainsi jusqu'à ce qu'on voie sortir une fumée noire et épaisse à l'entour du pot ; ce qui se fait en moins d'un demi-quart d'heure de temps ; et par cette précaution on n'est point en risque de se brûler, ni contraint de renverser le pot, comme il est arrivé à plusieurs personnes, faute de prevoyance.

“ Il y a des imprimeurs qui soutiennent qu'il est nécessaire de mettre de la térébenthine dans l'huile, disant qu'elle rend l'encre plus forte, qu'elle empêche que l'impression décharge, et qu'elle sèche plutôt ; tout cela est incontestable, mais ils ne prévoient point les accidens qu'elle peut causer ; c'est ce que nous allons faire voir.

ful examination of its general appearance throughout the whole, it carries evident marks of not distributing well, or spreading freely

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“ 1° Quand on ne fait point cuire cette térébenthine précisément comme elle doit l'être, pour la mêler avec l'huile [illegible]e rend le vernis si fort et si épais, qu'il déchire les feuilles de papier sur la lettre de la forme ; de sorte qu'elle est remplie en fort peu de temps.

“ 2° Quand même la térébenthine serait cuite comme il faut, il suffit de dire que c'est une matière semblable à une pâte fort liquide, et qui est remplie comme des petits grains de sable, qui ne se démêlent presque jamais avec le vernis, et restent au fonds du pot; de sorte que quand ou vient à se servir de ce vernis, on ne doit point être étonné si tous ces petits grains remplissent quantité de lettres de la forme.

“ La térébenthine se cuit séparément dans un pot, lequel on doit absolument faire bouillir dans une cour, parce que le feu s'y prend trop facilement, et qu'il est trop difficile à éteindre. Quand cette térébenthine aura été sur le feu l'espace de deux heures ou environ, on trempe un morceau de papier dedans, et si elle se brise net comme la poussière, sans qu'il ne reste rien attaché dessus, en frottant ce papier sitôt qu'il sera sec, c'est une preuve que le térébenthine est assez cuite. Alors on éloigne du feu le pot où est le vernis, pour mettre la térébenthine dedans. Ce mélange se fait en remuant le vernis avec la cuiller de fer, ensuite on remet ce vernis sur le feu l'espace d'un quart d'heure, en remuant dans le pot avec la cuiller de temps en temps, afin que le vernis se mélange bien avec la térébenthine.

“ Ceux qui ne voudront point se servir de térébenthine, pour les raisons que nous venons de donner, pourront prendre leur provision d'huile d'une année a l'autre ; car plus elle est vieille, plutôt elle est cuite, et par cette précaution le vernis n'est point sujet à maculer l'impression.

“ *De la manière de faire le Noir de fumée, et de son mélange avec le Vernis, pour faire l'Encre d'imprimerie.*

“ Le noir de fumée est la fumée de la poix-résine brûlée qu'on ramasse dans une petite chambre bien fermée et tapissée de peau de moutons à l'entour, d'où après on le fait sortir en les secouant ; mais comme il est dangereux de mettre le feu à la maison, il est plus à propos de faire ce noir dans une tente, un peu éloignée de la maison, dessous un toit de tuiles.

“ Ceux qui font continuellement le noir de fumée appellent cette tente *le sac-à-noir*, lequel est construit de quatre petits soliveaux de trois ou quatre pouces en carré et de sept à huit pieds de haut, soutenus par deux travers de bois à chaque côté, savoir un en haut et un en bas, tout de même que si c'était un bois de lit, avec une petite porte pour y entrer en se courbant un peu.

“ On peut faire ce *sac-à-noir* aussi grand que l'on veut, le dessus de ce *sac* est un plancher, qui doit être bien joint ; il y en a qui font un plancher dessous ; mais de crainte que le feu y prenne par quelqu' étincelle, il est plus

on the types, and being equal to the quality of the paper. This I have no doubt will be found the case by any person who chooses

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convenable de le paver avec des carreaux de poterie bien unis: ensuite on attache à l'entour de ces quatre soli[illegible] de la toile, qu'on étend le plus fort qu'il est possible, avec de petits cloux de doux pouces de distance l'un de l'autre, en observant de bien boucher toutes les fentes de tout côté, cela fait, on colle des feuilles de papier fort, dessus toute la toile, de même que sur les jointures du plancher, et à l'entour des bordures d'en bas, afin que la fumée ne sorte point par aucun endroit, attendu que c'est de la fumée que se fait le noir.

" Ce *sac-à-noir* étant ainsi accommodé, on prend un pot de fer, à proportion de la grandeur du *sac*, de crainte d'y mettre le feu; lequel pot on remplit de poix-résine, à un bon pouce près, laquelle poix-résine on casse auparavant par morceaux de la grosseur d'un bon pouce environ.

" Ayant ainsi rempli ce pot de poix-résine on le pose au milieu du *sac-à-noir*, et on y met le feu avec du papier; et lorsque la poix-résine est bien allumée, on ferme la porte, laquelle doit être bien jointe, et crainte qu'il y passât de la fumée par les jointures, on doit avoir soin de les bien boucher, soit avec du papier, soit avec du linge.

" Quand cette poix-resine sera entièrement consommée, et que toute la fumée sera attachée au *sac-a-noir* (ce qu'on pourra connaître lorsque ledit *sac* sera entièrement froid) il faut trapper dessus le plancher du *sac* et tout à l'entour de la toile, afin de faire tomber tout le noir qui y est attaché.

" Lorsque tout le noir sera tombé sur le pavé, ce qui se fait en moins d'un demi-quart d'heure de temps, on peut ouvrir la porte, et ramasser ledit noir avec un petit balai pour le mettre dans quelque vaisseau; ensuite on remet de la poix-résine dans le pot, laquelle on fait brûler comme nous venons de dire.

" On peut cependant faire brûler de la poix-résine aussi long-temps que l'on veut, sans qu'il soit nécessaire de faire tomber le noir sur le pavé, à chaque fois que l'on voudra mettre de la nouvelle poix-résine dans le pot.

" On doit toujours avoir la précaution de couvrir le pot auparavant de battre le *sac*, pour empècher que le noir ne tombe dedans.

" Quelquefois il arrive qu'en ramassant le noir du pavé avec le balai, il s'y rencontre de la poussière, graviers, ou quélqu'autre chose, contraire au dit noir; dans ce cas, il faudrait mettre ce noir dans un vaisseau où il y ait de l'eau; par ce moyen, toutes les ordures s'en iront au fond, et le noir restera dessus l'eau. Voilà de quelle manière on fait le noir de fumée, à l'usage de l'imprimerie.

" *Du mélange du Noir avec le Vernis pour faire l'Encre.*

" Pour faire le mélange du noir de fumée avec le vernis, il faut verser le vernis dans un petit vaisseau, dans lequel on met du noir de fumée; car tous

to try the working of it, as I am fully convinced that all inks containing so large a portion of prussian blue, however fine it may

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autre noir ne vaut rien pour l'impression, et le plus léger est le meilleur; plus on met de noir, plus l'encre est épaisse, c'est pourquoi il n'en faut mettre qu'autant qu'il est besoin: ensuite on broie le tout ensemble extrêmement fort, avec un bâton fait exprès, afin que le noir se mêle bien par-tout avec le vernis, jusqu'à ce qu'il soit réduit comme de la bouillie épaisse qu'on ôte du feu; et toutes les fois qu'on voudra prendre de cette encre pour la mettre dessus l'encrier de la presse, on la doit encore bien broyer avant de s'en servir.

"On doit observer de bien nétoyer l'encrier avant de mettre son encre dessus, parce qu'il s'y amasse ordinairement une quantité d'ordures, comme du crin, de la laine, et autres semblables choses.

"Quand on veut faire son encre sur l'encrier de la presse à mesure qu'on en a besoin, on met ordinairement cinq onces de noir de fumée contre deux livres de vernis, poids de seize onces; mais comme cela n'est pas toujours si précis, attendu qu'un noir se trouve quelquefois plus pesant que l'autre, ou que le vernis est plus ou moins épais; ainsi pour une plus grande certitude, on doit avoir deux différentes mesures, l'une pour le vernis et l'autre pour le noir, lesquelles on gardera expressément lorsqu'on aura remarqué ce qui sera nécessaire pour la quantité de l'un et de l'autre, pour que l'encre soit toujours d'une même épaisseur et d'un noir égal.

"Ainsi, ayant mis sur son encrier la quantité de noir qu'il faudra pour le contenu de la mesure du vernis, on le doit broyer de la manière que nous venons de dire. C'est ainsi qu'on doit mêler le noir de fumée avec le vernis, pour avoir une encre toujours également noire.

"*De l'Encre Rouge.*

"Pour faire l'Encre rouge, on se sert du même vernis que pour la noire, excepté qu'il ne doit point être si fort, et au lieu de noir on y met du *cinabre*, autrement dit du *vermillon*, lequel doit être bien broyé au sec sur un marbre (cela s'entend lorsqu'il est en pierre) et que l'on broie ensuite sur un encrier pour cet usage, de la même manière qu'on fait pour le noir.

"On peut y ajouter un morceau de colle de poisson de la grosseur d'une noix, que l'on fait tremper l'espace de vingt-quatre heures dans un peu d'eau-de-vie et que l'on mêle bien avec ledit vernis et le rouge; ce qui rend l'encre fort luisante.

"On doit aussi broyer cette encre tous les matins et les après-midi, de même qui si on commençait à la faire; afin que le rouge et cette colle se mêlent bien avec le vernis.

"Il se fait ordinairement une croûte sur cette encre, quand on est quelque temps sans s'en servir; pour empêcher cela, il faut mettre de l'eau dans l'encrier, et le pencher un peu; afin que l'eau nage par dessus l'encre, et

be ground, will invariably work foul; nor do I think the capivi balsam a good varnish for lamp-black, as the least exposure to the air on the ink-block would cause it to become thicker and more glutinous, and, in a few hours, destroy altogether the freeness of working.

For Coloured Inks I feel no hesitation in recommending it, combined with about one-fourth by weight of soft soap, as it keeps the heavier-bodied colours much longer suspended, and does not so soon become hard when ground with prussian blue, or vermilion, which is always the case when the common printer's varnish is used.

Some few observations to the workmen, on the application of the ink, will close this part of the subject; and this I consider to be the more necessary, as there appears to be a total want of discrimination in the use of ink of different bodies, for in examining various printed works, of my own as well as other printers, I have generally found the colour has been kept up considerably higher than the quality of the ink admitted. This over-inking is the most common and serious defect of the pressman, and, consequently, I wish particularly to impress upon his mind the necessity of adhering strictly to the precise shade intended to be produced, as in all cases where there is a greater quantity laid on than the ink-maker intended, either the varnish or the black must predominate; the one running into the paper and changing its colour, and the other lying in too great a body on the surface, and setting off when bound.

In furtherance of these remarks, and for the more immediate guide of the pressman, I have added specimens of pages printed

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qu'elle ne s'écoule point; laquelle eau on jette dehors, quand on veut se servir du rouge, et on broie l'encre à l'ordinaire · voilà la meillure méthode dont on puisse se servir pour faire l'encre rouge.

" Pour le noir à l'usage de la taille-douce, le plus pesant est le meilleur; c'est ce qui est contraire à celui dont on se sert pour l'imprimerie: voici la méthode de le faire.

" Il faut de la lie de vin, qui soit bien sèche, et la faire brûler au milieu du feu; et lorsque cela est réduit en charbon, on l'éteint dans l'eau, et on le broie de même que *le vermillon;* ensuite on le mêle avec le vernis pour faire son encre; en observant néanmoins que cette Encre doit être beacoup plus liquide que celle dont on se sert pour l'impression."—*Manuel de l'Imprimerie.* Paris, 1817, pp. 17—22.

with the different-priced inks generally in use, shewing the precise shade at which each quality will stand well, and produce the best possible effect. By examining carefully these specimens it will be perceived that every quality of ink is capable of producing good work when used in a proper manner, and with necessary care, the only difference being the strength of colour gained.

Every workman ought to be aware that the thin weak ink, at eighteen-pence per pound, is only intended to produce a very pale black, for quick working and setting; the two-shilling a shade deeper; the three-shilling, if good, is well calculated for the general purposes of book-printing, when there are no fine cuts introduced, and, with care, will even answer for those purposes: the six-shilling is suitable for all the uses of fine printing, and will produce, in its present improved state, as much effect as can be produced from the finer inks recently sold at nine and twelve shillings per pound. The colour of the work can be increased only by the quality of the ink; the better the quality of the ink the more time it will take the pressman to work it, and the better may be the paper; it is impossible to work fine ink upon bad paper, and no employer can expect his work to look a fine and rich colour, if either the printer or stationer be straightened in the price of their respective commodities.

The requisites of being very stiff without strong adhesion; of keeping always soft and mellow, but drying quickly and without loss of colour as soon as it is on the paper; of adhering strongly to the paper, but not to the type; are qualities much to be desired, but difficult to be attained, even by those who have been long practised in the art of ink-making; nor indeed, do I know of any maker who has wholly succeeded in obtaining them. That of drying quickly without being made too glutinous for working freely, would, indeed, appear to be an advantage utterly unattainable, as what induces the drying quality has hitherto been found to prevent, in equal ratio, the freedom of working, and tending, also, to deteriorate the colour. I have not hitherto found any means of approaching this object, but by keeping strong inks in tin cans, in a warm room for a considerable time, twelve months at least, which I then find become much mellowed, and to work soft and well.

Many efforts have been made to conquer these difficulties;

many printers have thought themselves possessed of this *aurum potabile*: many have been the trials made by printers of newly-set-up ink-makers, with a view, from their pretensions, of obtaining this object alone; but I have found that instead of general improvement, if this object was in any degree attained, the other qualities seemed to retrograde in proportion. I have, however, some hopes that it is, at last, in a great measure effected; some experiments made by the firm to which I have before alluded (p. 721*), seem to have brought the article nearest the desired degree of perfection; and, if experience should prove this to be the case, there is not, in my opinion, any thing further to be wished for in the art of ink-making.

As I have said before, Mr. Colvil succeeded to the connexion, and retains the premises, of Mr. Blackwell.

Mr. Vaughan Griffiths is also an ink-maker of long standing and some eminence in the metropolis.

Mr. Foster, so often mentioned as the inventor of the composition balls, is also now in this line.

And in the Appendix I will continue the enumeration.

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* Messrs. Thos. Martin and Co. of Birmingham, whose London agent is Mr. T. Bishop, 10, Fisher-street, Red Lion square.

THE OVERSEER, &c.

CHAPTER IX.

Of the Overseer of a Printing Office—His Duties—Rules for the good Government of the Office.

IT would be perfectly in the power of any master to conduct and read for business to the extent of four or five presses without the aid of an Overseer, if he were not subject to repeated interruptions by attending to the out-door department; but the nature of the printing business is such as to render it indispensably necessary that some person, in a superior capacity, should be *always* on the spot; a person, therefore, is generally employed as Superintendent or Overseer, from whom the journeymen receive their instructions, and to whom they pay respect and deference. Compositors and pressmen are at all times dependent on each other; they, therefore, demand the constant attention of some one in authority, in order that nothing may occur to cause a stoppage or standing-still to either party, and I shall proceed to offer a few hints, and to lay down some rules for the conduct of a person filling the respectable and important situation of an Overseer.

He should be the first and last in his attendance to business; viz. the first in the office in the morning, to see that the journeymen (if any on established wages), warehousemen, apprentices, and errand boys, are at business at the regular time; and the last in the office in the evening, to despatch proofs, messages, &c. by the errand boys, and to lock and secure the doors, closets, fires, and lights.

His attention to these points is of great importance, and cannot, in a well-regulated house of much business, be dispensed with; it must be the province of some one, and to whom can it so properly belong as to the next in rank to the master, who professes, and whose duty it will be, to regulate and keep in order the different persons employed in his concern?

After the office has been swept, and he has seen the scattered type selected from the dust, and placed at the end of each frame to which it belongs, he should see that each compositor immediately distributes it in the proper cases. He should go regularly through the composing-room, and again cast his eye about every frame, in order to discover if any pie be left on it, or on the bulk attached to it. If he discover any, even a single letter, he should desire the compositor to distribute it. His uniform attention to this particular is of great importance; for it will be the means of keeping useful and necessary sorts in their proper places, which would be otherwise buried in a mass of pie, as well as give a neatness of appearance to the office, which is both pleasing and respectable.

The manager of a printing-office should be well acquainted with the exact state of every work in hand, and use the following, among other methods, to expedite and complete them. First, to keep a book (post quarto is a very convenient size) which may be called, The Proof Registry; a page, or two opposite pages, must be taken for each work, as put in hand; after the title of the work is written, columns should be ruled for the necessary heads; as, for example:

EVERY MAN HIS OWN WAG:

1824. *Proofs to Author—Mr. Raventop, New York: per two-penny post.*

Sig.	Proof Out.	Returned.	Revise Out.	Returned.	To Press.	Remarks.
B	Oct. 6	Oct. 7	Oct. 9	Oct. 10	Oct. 12	Out of Copy Oct. 16.
C	— 9	— 10	— 12	— 13	— 14	
D						
E						Copy received Oct. 22.
F						

This book will be of as great importance in a printing-office as a log-book on board a man-of-war. By it, the Overseer will be at all times enabled to state to the master or employer the exact progress of every work in hand; it will enable him to foresee the necessary provision of work for the presses, and ordering the paper out for wetting. It may be the means of exonerating him and his employer from many a load of blame for imputed delay of the work, for an author will seldom allow that *he* detains the proofs, or furnishes a scanty supply of copy: if he keeps a proof a week, he will still expect a fresh proof every day; and if he does not see in proof the last line of copy which he has sent, he will wonder how the compositors can be "out of copy;" and when a fresh supply is delivered, with perhaps four or five long-detained proofs at the same time, he will complain to the bookseller that his work is stopped by the printer, if he should be a couple of days without *proofs* of progress: now this book will be at once a ready answer; booksellers know the necessary routine to be observed, and though it is sometimes hard to convince them that the printer is blameless, yet dates speak facts that no man can get over.

In watching the progress of the work among the journeymen, he will have frequent occasion—To take care that in companionships no man shall be permitted to retain too large a taking of copy, which will keep the other companions composing at random longer than they ought to be, and also block up and engage a larger quantity of letter than would be necessary if regularity were observed in this respect, as well as retard the imposition of the sheet, and in all probability keep both pressmen and compositors standing still—To order the imposition of a sheet the moment it is composed and made up, if there be room on the imposing stone for that purpose and furniture disengaged—When the sheet is imposed, to be equally expeditious in getting it pulled and read.—After it is read, the compositor should, without delay (if no obstacle occurs) correct it; and when corrected, it should be immediately pulled and given to the reader, either to be sent to the author, if required, or to be read for press, which, when done, the same expedition should be used in getting it finally corrected for press.

By following these methods closely, he will be enabled to keep compositors and pressmen regularly employed; and, if he have to do with steady men, will establish and preserve his master's character for despatch and punctuality.

An Overseer should possess a perfect knowledge of every branch of his profession. It sometimes happens that the absence of the reader may lay him under the necessity of *reading for press;* he should, therefore, be well qualified for that task; those qualifications to which we invite his attention, are fully laid down in the next chapter. He should also possess a firmness of character not easily intimidated, with urbanity of manners, which will assuredly gain him the esteem and respect of all about him.

Sorts not in common use, furniture, chases, leads, &c. should be under his care and lock, that they may be in readiness for delivery when wanted; and, in the meantime, be saved from plunder—*prevention is better than punishment*. A memorandum book, in which particular sorts are entered, would be found highly useful.

It should be the business of the Overseer to revise the proofs for press; in doing which he will be careful not only to ascertain whether all the corrections marked in the proof are made, but also to cast his eye carefully over the sides, head, and bottom of each page, as it frequently happens that the folios or catch-words drop out of the forme in lifting it off the imposing stone; also in leaded matter, letters at the beginning and end of lines frequently fall out of their proper place, and by their standing crooked, have a slovenly appearance. Before the revise is given to the compositor, the number of the press for which it is intended should be marked at the bottom of an even page. It should be an invariable rule with the Overseer to require a second revise, or fair sheet, before proceeding, in order to see if all the corrections have been made which were marked in the first; this is indispensably necessary, particularly with foul compositors, as no sort of dependance can be placed on them.

He should, where there is not a person engaged expressly for the purpose, go regularly round, about every quarter of an hour, to the different presses; and examine their work, point out defects, if any, and glance again over the heads, sides and bottoms of the pages, to see if any thing has been drawn out by the balls or rollers, which frequently occurs, from bad justification of the lines, and careless and improper locking-up of the forme: he should turn up the heap to see that both sides are kept of the same degree of colour; and that the set-off sheet is changed as often as may be necessary.

An active and conscientious Overseer will not be content with merely managing the concerns of the composing-room and press-room; he will also see that the business of the warehouse is attended to with regularity and accuracy; and that the warehouseman, errand boys, and apprentices do their duty.

It will be difficult for the Overseer, even with the strictest attention on his own part to the foregoing advice, to preserve order and regularity without some fixed regulations, either generally understood, or particularly specified, and which it may be very well to have either written or printed, and hung up in a conspicuous part of the office. I submit the following, the major part of which have been adopted by various offices.

RULES AND REGULATIONS PROPER TO BE OBSERVED IN A PRINTING-OFFICE.

Compositors.

1. Compositors to receive their cases from the Overseer, or other person appointed by him, free from all pie, or other heterogeneous matter, with clean quadrat and space boxes to both roman and italic, which they are to return to him in the same clean state.

2. When a Compositor receives letter, furniture, &c. from the Overseer, he is to return what he does not use, in a satisfactory state.

3. Compositors to impose their matter when desired by the Employer or Overseer; and the same for proofs that are desired to be corrected; unless in either case it shall appear that all the stones are engaged.

4. When the Compositor imposes from a forme, he is directly to tie up the pages of loose matter.

5. Formes, immediately after they are imposed, to be carried to the proof-press; and the proofs, when pulled, to be given to the Reader, or carried into the reading-closet, with, if a first proof, the copy; and, if a second, the foul proof.

6. No Compositor shall leave a foul stone, either of letter, furniture, &c.

7. No Compositor to detain an imposing stone longer than the nature of the business may require.

8. When any cases are taken out of the racks, the Compositor is to return them into their proper place immediately after he has done with the same.

9. No cases to be placed over others, or under the frames.

10. Galleys with head-lines, or other useful materials, during the course of a piece of work, to be cleared at farthest the day after the work is all completely at press.

11. When a work is finishing, the Compositor, or Compositors concerned shall, as the formes are finally worked, clear them away, taking from them the head-lines, white-lines, and direction-lines, as also the leads and reglets, which, with the furniture of each sheet, the matter being properly tied up for papering, are to be given to the Overseer, or any person he may appoint.

12. Sweepings of frames to be cleared away before one o'clock every day. Matter broken by accident to be cleared away on the same day.

13. No Compositor to mix two separate founts, without an express order from the Overseer.

14. When a Compositor carries his forme down for press, he is not to put two formes together without a partition between them.

15. The saw, saw-block, bowl, sponge, letter-brush, sheers, bellows, &c. to be returned to their respective places as soon as done with.

16. No person to take a candlestick, bodkin, snuffers, composing-stick, &c. not his own, without permission of the owner.

17. No person to misplace cases in the rack, or take an upper without the lower case, or *vice versâ*.

18. Pie of any sort, on boards, windows, frames, &c. to be cleared after five minutes' notice.

19. No person to take sorts from the frames or cases of another without leave; nor to hoard useful sorts, not immediately wanting them.

20. No person (except the Master or Overseer) to call off the errand boy while he is sweeping his rooms.

21. No candle to be left by any one, except in charge of some proper person; and the boundaries of the office to be considered, in all cases, the open air.

22. Jobs to be cleared away immediately after notice having been given by the Overseer.

23. These regulations, in cases of extreme hurry of business, by leave from the Master or Overseer, may be suspended; but, when that has ceased, to be immediately resumed.

Pressmen.

1. All proofs to be pulled within five minutes after notice, by the Pressmen who are in proofs.

2. Immediately after pulling a proof, the Pressmen to rub over the formes and chases with a ley-brush, and place them against the Compositor's frame to whom they belong, where they are to leave the proof.

3. Not to work without a figure unless particularly ordered.

4. As soon as a forme is wrought off, the Pressman to carry it to the ley trough, and there completely rub it over with ley, rinse it with water, and then carry it to the wrought-off place, or to the end of the Compositor's frame it belongs to.

5. Not to leave the ley-jar uncovered.

As to enforcing such rules by fines, as recommended by Mr. Stower, in his Printer's Grammar, I very much disapprove of it. If the Master possesses a proper portion of the *suaviter in modo* blended with the *fortiter in re,* he will *command* the observance of such necessary regulations in his own house; and the odium of inflicting fines may be dispensed with. If he have not these qualities, the tribunal necessary to be erected in his office for the cognizance of delinquencies of this sort will be such a fertile source of destruction of time, creating of party, encouraging spite, and promoting chapelling and combination, that his office would be better if altogether without laws. The foregoing regulations are, therefore, retained without the penalties, since every one can add them at his pleasure. Pecuniary fines are not likely to bind those to the interest of an employer whom honour fails to influence: and, from my own practice, I feel authorized in recommending suitable firmness in the Master and his Overseers, as more likely to operate serviceably on the good sense of the men and boys, than any exactions can do. Journeymen are not likely to be so scarce as to make it necessary to keep those who will not conform to reasonable rules, framed for the good of all; and apprentices must obey them at the order of a Master, or abide by the consequences of the alternative.

THE READER, &c.

CHAPTER X.

Corrections of Proofs—Marks of Corrections—Correcting in Metal— QUALIFICATIONS AND DUTIES OF A READER.

IT has ever been, and ever ought to be, the chief object of eminent printers to aim at accuracy; so that while they have especial care to render what issues from their press as free as possible from professional faults, they will be still more assiduous in avoiding literary errors. The office of Corrector should, therefore, be conferred on one who has not only a perfect judgment of his mother tongue, but who has some knowledge of such languages as are in frequent use, viz. the Latin, French, Italian, Hebrew, Greek, &c., and who possesses, moreover, a quick and discerning eye. These are the accomplishments by which a Corrector may raise his own and his employer's credit; for it ought to be a consideration with booksellers to give their works to be done by printers whom they know to be either able correctors themselves, or who employ persons properly qualified by liberal education and general knowledge. It is certainly the author's province to see that his book be correctly published, either by delivering his copy very accurately and fairly written, or by carefully perusing the proof sheets: but the advantage is great in having the aid of a well-qualified Corrector, who may detect the inaccuracies in thought or language of the author, and by judicious suggestions contribute to the perfection of his work.

If a printer be aware that the copy put into his hands is incorrectly written or badly digested, he should either refer it to the author for revisal, or, if the incorrectness be such as he may venture to rectify himself, it should be done before it is wanted by the compositor, that he may not be hindered or prejudiced by alterations in the proof. In all cases where he perceives an unusual spelling or use of words; a changing and thrusting in of points, capitals, or any thing else that is ill-judged and has nothing but fancy to warrant it, it is requisite for him to divest a work of all such pedantries.

What is chiefly required of a Corrector, besides espying literal faults, is to spell and point according to the best authorities (though, after all, he will find himself continually called upon to vary his practice according to the opinion of the author, whose work is passing through his hands); and that the compositor may become acquainted with and accustomed to his mode, the best expedient will be, to draw out, by degrees, a catalogue of such peculiarities.

As it is necessary that Correctors should understand languages, so is it requisite that they should be acquainted with the nature of printing, else they will be apt to commit themselves by objections to things done *secundum artem.* It is for this reason that correctors in most printing-houses are chosen out of compositors that are thought capable of that office; and who know how not only to correct literal faults, but who can also discern the improprieties of workmanship, which cannot be expected from gentlemen who have no technical knowledge of printing.

The manner in which errors are noticed in a proof, is by a peculiar set of marks or signs; and in order to illustrate the instructions on this subject, an engraving is subjoined, in which each respective mark is exemplified.

A wrong letter in a word is noticed by drawing a short stroke through it, and making another short stroke in the margin, behind which the right letter is placed. (See plate, and mark 1.[*]) *A wrong word* is corrected by drawing a line across it, and making the right one in the margin, opposite the faulty line. (See mark 2).

Where a word or words have been left out, or are to be added to the line, a caret must be made in the place where they are intended to come in, and the word, or words written in the margin.

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[*] It is to be noticed that these figures are not used to corrections, except occasionally, where, by being very numerous, a compositor might be led to mistake one for another; and these corresponding marks used in the lines are applied here only for the purpose of reference to the examples in the plate.

Where a space is wanting between two words or letters that are intended to be separated, a parallel line must be drawn where the separation ought to be, and the sign 4 placed opposite in the margin. Also, *Where words or letters should join*, but are separated, the mark 5 must be placed under the separation, and the junction of them signified by the same mark in the margin.

When letters or words are set double, or are required to be taken out, a line is drawn through the superfluous word or letter, and the mark 6 placed opposite in the margin.

A turned letter is noticed by making a dash under it, and the mark 7 in the margin. Marking turned letters tries a Corrector's knowledge of the true formation of them, without which it would be better to mark them in the same manner as they do wrong letters, unless they are very sure that they can distinguish b, d, n, o, p, q, s, u, x, z, when they are turned, from where the same letters stand with their nick the right way.

Where a space sticks up between two words, it is noticed by a *cross* in the margin. (See 8.)

Where two words are transposed, the word placed wrong should be encircled, and the mark 9 placed in the margin; but where several words require to be transposed, their right order is signified by a figure placed over each word, and the mark 9 in the margin.

Where a new paragraph is required, a line in the shape of a crotchet should be made, and the same mark (10) placed in the margin; also where a paragraph should not have been made, a line should be drawn from the broken-off matter to the next paragraph, and in the margin should be written, *No break*. (See 11.)

Where several lines or words are to be added, they should be written at the bottom of the page, making a line from the place where the insertion begins, down to those lines or words. (See 12.) But where so much is added as cannot be contained at the foot of the page, write in the margin, *Out, see copy*.

If letters or words are to be altered from one character to another, a parallel line or lines should be made underneath the word or letter, viz. for capitals, three lines; small capitals, two lines; and Italic, one line; and in the margin, opposite the line where the alteration occurs, should be written, *Caps. Small Caps*, or *Ital.* (See 13.)

Where words have been struck out that have afterwards been approved of, dots should be marked under such words, and in the margin should be written, *Stet.* (See 14.)

Where the punctuation requires to be altered, the semicolon, colon, and period, should be marked in the margin and encircled. (See 15.) 16 describes the manner in which the hyphen and ellipsis line are marked: and 17, also, the manner in which the apostrophe, inverted commas, the star, and other references, and superior letters, and figures are referred to.

Where letters or lines stand crooked, they are noticed by drawing lines before and after them. (See 18.)

When a letter of a different fount is improperly introduced, it is noticed by the mark, 19.

When corrected, according to these marks, the page will read thus:

"THE art of Printing is but three hundred and sixty-five years old; and it long remained an undetermined point between the city of Mentz in Germany, and the city of Haerlem in Holland, concerning the place where, and the person by whom, this divine art was first invented and practised, but, at this time, the majority of voices have determined the dispute in favour of Mentz: however, we shall give both their pleas.

"It is said to be first attempted at Mentz, between the years 1440 and 1450, by John Fust, or Faust, John Meydenbuch, and John Genesteisch, surnamed Guttemberg.

"It was a question long controverted by many learned antiquarians, whether Guttemberg or Faust was the inventor of that art, till happily the original instrument was found, whereby it appears, that the latter only connected the others with him for the sake of their purses, he not being able to proceed without, on account of the great expenses attending the cutting of the blocks of wood; which, after they were once printed from, became entirely useless for any other work. The *instrument*, which is dated Nov. 6, 1455, is decisive in favour of GUTTEMBERG; but the honor of single types, made of metal, is ascribed to Faust, wherein he received great assistance from his servant and son-in-law, Peter Schoeffer, who," &c.

Inaccuracy, in some cases, may be laid to the inattention and

An Exemplification of Typographical Marks.

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Whereby it appears, that^on account of the great expences attendi/g the cutting of the blocks of wood ; whi/h, a∫fer they were once printed from,bec/me ~~entirely~~ useless for any other work. This instrument which is dated Nov. 6, 1455 is decisive in favor of Guttemberg; /but the honŏr of single types made of m/etal,is ascribed to Faust|wherein he receiv/ed great assistance from his servant and s/on-in^law Peter $chocffer, who;" &c.

[12] *The latter only connected the others with him for the sake of their purses, he not being able to proceed without.*

Stuffield sc.

carelessness of the printer; it must often unavoidably arise from the almost impossibility of having a thorough knowledge of every language, whether those generally in use, or those which are denominated dead languages; or from a want of knowledge of the arts and sciences, and other abstruse subjects, wherein technical phrases and terms of art often occur, which, unless very distinctly written, may be misunderstood by the most attentive and accurate corrector; and when it is considered that proof-sheets of various works, on as many different subjects, may pass through the hands of the Corrector, in his professional capacity, in one day, and an interval of several days before the succeeding sheet of the same subject may follow, it cannot be expected that any man's memory will be strong enough to connect the ideas of each author so as to afford much assistance if he is not clear and distinct. in fact, by remembering too much of one author, he might incapacitate himself for doing justice to another. I have long ventured an opinion that a Reader's chief business is *to forget;* and that the best rule to observe is, as soon as he takes up one proof, to have no thought of any thing that preceded it. Thus, in all cases, but particularly in those where the author has it not in his power to see the proof sheets, accuracy and distinctness of copy is peculiarly desirable.

If attention be paid in the copy to the right spelling of proper names of persons, places, technical terms, &c.—to marking the close of sentences by the period, so that the author's ideas may not be misunderstood, and, above all, to the hand-writing being clearly legible, much time and a very considerable expense will be saved, and the great object of accuracy better ensured.

Of making the Corrections in the Metal as designated by the Marks above described.

Correcting is the most disagreeable part of the Compositor's business, attended not only with loss of time, but with great fatigue; and from the pressure on the stomach by leaning over the stone, it is extremely prejudicial to health. This is only to be avoided by careful distribution, silence, and due attention when at work. The noise and confusion which too often prevail in a printing-office, from light and frivolous conversation, not only retard business, but at the same time attract the attention of the Compositor from the subject he has in hand, and cause him to make mistakes which can only be rectified by loss of time, and fatigue at the imposing-stone. Some men, no doubt, are capable of supporting a conversation, and, at the same time, of composing correctly; but their noise confuses those who are unable to ensure their accuracy but by quietness and a close attention to their copy. The practice of talking while distributing, prevails too much; for although those who may be composing need not join in the conversation, yet they are disturbed and diverted by it from the business they have in hand. The press-room is always, if possible, separated from the composing-room, as the work of pressmen is less liable to detriment from talking.

The first proof contains, generally, only the errors of the compositor; but it is almost impossible to discover the whole of them in the first reading; he is therefore expected to correct all his blunders, whether in the first or second proof, without making a charge for it.

Immediately on receiving his proof, the Compositor should begin to correct the matter, as the delaying it may occasion him to stand still for want of a return of letter; or be the means of keeping a press idle.

When he has gathered as many corrections between the thumb and fore-finger of his left-hand as he can conveniently hold, and having an assortment of spaces on a piece of paper, or, what is more convenient, in a small square box with partitions in it, taking the bodkin in his right-hand, let him, instead of raising each letter he may have occasion to alter, place the point of the bodkin at one end of the line, and with the fore-finger of his left-hand against the other, raise the line, altogether, sufficiently high to afford him a clear view of the spacing: he may then change the faulty letter, and alter his spaces before he drops the line. By observing this method, he will not injure the type, which must be the case where the bodkin is forced either into their sides or heads; it likewise ensures a greater degree of regularity where there may be occasion to alter the spacing, and will not take up more time than the other method.

The most careful Compositor cannot at all times avoid leaving a word or words out, or composing the same word twice. When either of these happens, he should consider the best mode of rectifying the accident, whether by *driving out*, or by *getting in* above or below it. This ascertained, let the matter be taken into a galley, and overrun in the composing-stick; overrunning on the stone being an unsafe, unworkmanlike, and dilatory method, which destroys the justification, and renders the spacing uneven.

In correcting, care should be taken not to hair-space a line where it can possibly be prevented; and to avoid it, overrunning, either backward or forward, must be judiciously adopted. The Compositor should also, in overrunning the matter, use the division as little as possible; for although he may carefully follow the instructions laid down in this work on the subject of spacing and dividing, yet the effect of his attention will be completely destroyed, if not followed up at the stone.*

The proof having been properly read and corrected, is then to be sent to the author, or person authorized by him to superintend the progress of the work through the press; either of whom, if they understand the nature of printing, will not defer reading the sheet, but return it with as few alterations as possible, to be got ready for the press. But authors who give much consideration to these circumstances, are very rarely met with.

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* *Vide*, also, p. 412 *et seq.*

QUALIFICATIONS AND DUTIES OF A READER FOR THE PRESS.

When it is considered how much the credit of our art, and the general purposes of literature depend on grammatical accuracy and typographical correctness, it will readily appear that a careful and steady *Reader* must be indispensable in every printing-office. We will therefore detail the qualifications requisite to form such a Corrector of the press, as can alone save the typographic art from degenerating into one of those ordinary occupations that require only the mechanical operation of the fingers; and then give a few general rules relative to the business of a Corrector of the press.

It is always desirable that a Reader should have been previously brought up to the business of a compositor. By his practical acquaintance with the mechanical departments of the business, he will be better able to detect those manifold errata, which, when suffered to pass, give an air of carelessness and inattention to our labours, that must always offend the just taste and professional discernment of all true lovers of correct and beautiful typography.

Some of the principal imperfections, which are most easily observed by the man of practical knowledge in the art of printing, are the following: viz. imperfect and wrong-founted letters; inverted letters, particularly the lower-case s s, the n u, and the u n; awkward and irregular spacing; uneven pages or columns; a false disposition of the reference marks; crookedness in words and lines; bad making-up of matter; erroneous indenting, &c. These minutiæ, which are rather imperfections of workmanship than literal errors, are apt to be overlooked and neglected by those readers who have no idea of the great liability there is, even with the most careful compositor, to fall into them—nay, the almost absolute impossibility of wholly avoiding them.

Although, on these accounts, it is certainly desirable that every Reader should have been himself a compositor, we do not mean to infer, that even the imperfections we have just enumerated may not be observed by a Reader who never was practically acquainted with the mechanical part of our business. Long and frequent habits of reading proof-sheets for the press, a quick eye, and a steady mind, will certainly enable any one, even though not a compositor, to detect those lesser deviations from correctness, which the inexperienced and the careless are apt to overlook. But while these habits are acquiring, without which no person can be safely trusted to read a sheet for press, the labours of the printer are liable to go forth into the world in a manner that will reflect dishonour on the employed, and give offence to the employer. This observation will apply even to those Readers who have previously been compositors. No proof-sheet, therefore, ought to be put to press; until it has been carefully read and revised by an *experienced* Reader.

But even habit itself is not sufficient to form a competent Reader, unless he possess those literary qualifications which are obviously necessary in an employment of this nature. No one ought to undertake the business of a Reader, until he has made himself complete master of, at least, his native language.

A Reader should be well versed in all the peculiarities of the English tongue—its idioms, its true genius, and singular adaptation to that variety of expression in which we embody our thoughts, and portray the human intellect. Instances will frequently occur, particularly in large printing-offices, where a knowledge, of this nature and extent, will be almost indispensable. Many, even of our first-rate authors, are too apt, in the warmth of discussion, the flights of speculation, and the laborious exercise of the thinking powers, to pass over, unobserved, those deviations from pure diction and strict grammatical accuracy, which they have imperceptibly acquired the habit of falling into, by their ordinary conversation with mankind. Now, although no Corrector of the press can strictly be required to do otherwise than to *follow his copy,* that is, faithfully to adhere to the original, with all its defects, yet every one must perceive, that it would often be performing a friendly, and perhaps a charitable service, to point out, in proper time, imperfections and mistakes which have escaped the observation of a quick or voluminous writer. This remark will, however, chiefly apply to inaccurate orthography, and glaring instances of erroneous syntax. With the spirit, the opinions, the whims of an author, no Corrector of the press has any right to interfere. In reprints of old and standard works, very little freedom of alteration ought to be granted to either Correctors or editors.

We shall conclude this part of our subject by remarking, that a Reader ought not to be of a captious or pedantic turn of mind: the one will render his situation and employment extremely unpleasant, and the other will tempt him to habits destructive of that consistency of character in his profession which he ought ever scrupulously to maintain. We are here alluding to a strict uniformity in the use of capitals, in orthography, and punctuation. Nothing, indeed, can be more provoking to an author, than to see, for instance, the words *honour, favour,* &c. spelt with the *u* in one page, and perhaps in the next modernized, and spelt without that vowel. This is a discrepance which Correctors of the press should always carefully avoid. The like observations will apply to the using of capitals to noun-substantives, &c. in one place, and the omission of them in another. Whatever may be the different opinions or practices of authors in these respects, the system of spelling, &c. must not be changed in the same work.

There is an opinion very common among printers, that no standard can be laid down with respect to punctuation. It is true, authors differ much in their modes of punctuation; but this arises not so much from a want of system, as from an adherence to the *close* or the *loose* styles of pointing; and yet it must be confessed that no two persons would be found to point a work exactly alike, or the same person to point the same work alike, at two distant periods. Some authors think it beneath their notice, relying on the skill and experience of the printer in this respect. This being the case, the punctuation is often left wholly to the Corrector; and what has been disregarded as a matter of little consequence by the author, becomes an important part of the Corrector's business. Let him discharge this duty with all possible uniformity and care.

Having said thus much concerning the qualifications of a Reader, we proceed to point out the proper application of those attainments, and to show the process which every proof-sheet ought to go through before it is in a state of correctness proper to go to press.

While the pressman is engaged in pulling a proof, the compositors on the work ought to be collecting and arranging the copy, that both may be put into the hands of the Reader for the purpose of clearing it from the most glaring literals, always having the copy lying upon his desk or table, ready to cast his eye upon in case of doubt or misunderstanding. This process, which is a kind of slight comparison of the copy and the proof, having been carefully and deliberately gone through, if the proof be not exceedingly foul indeed (in which case it is best to have it corrected before he proceeds any further), the Reader should then call his reading-boy, to read the copy aloud to him. This assistant should be able to read with ease and distinctness any copy put into his hands; and he should be instructed not to read too fast, but to pay as much attention to what he is engaged in, as if he were reading for his own amusement or instruction. The eye of the Reader should not follow, but rather go before the voice of his reading-boy; for by a habit of this nature a Reader will, as it were, anticipate every single word in his copy; and whenever any word or sentence happen to have been omitted in the proof, his attention will the more sensibly be arrested by it, when he hears it pronounced by his reading-boy. Great care, however, ought to be paid, lest the eye of the Reader should go too far before the words of his reading-boy. For as he will be apt to be attending to the meaning of his author, he will read words in the proof which actually do not appear there, and the very accuracy of the reading-boy will but tend to confirm him in the mistake.

After having read through the proof with the reading-boy, he should examine the signatures, catch-words, head-lines, titles and folios of every page, and mark with accuracy the *prima*, or first words of the ensuing sheet. In marking the prima, care ought always to be taken, that not only the incipient word of the next sheet be marked, but also the number of the volume or part (when a work consists of more volumes or parts than one), and the succeeding signature and folio; as, for instance, thus; [carelessness, 3 F, 745. When all or any of these are neglected, if the compositor happen not to have set beyond the current sheet, which sometimes happens, or if he have not made up the first page of the next sheet, very serious errors are likely to occur.

The proof having been thus compared and read, it will, of course, be immediately forwarded to the compositor, to be corrected in the metal; when this is done, a *revise* should be immediately pulled, which, together with the first proof, should be returned into the hands of the Reader, whose next business is to collate the corrected sheet with the one he had before read, to see that all the errata are properly corrected. We believe it is the practice of some Readers not to revise their proofs, but immediately to proceed to read them a third time, for press. This is a dangerous mode of procedure, and ought *never* to be adopted. It is no small matter to clear a proof-sheet of all its imperfections: an error, once found, is therefore of too great importance to be passed unobserved; but this every Reader is liable to, unless he revise every page of his proof with the utmost care and attention: for few foul compositors are able, in the ordinary course of their labour, to correct every error marked in the first proof. In revising a proof-sheet, particular care must be taken, that none of the fresh errors escape which compositors often make in the course of correcting the original ones. To avoid this, the Reader ought not only to pay attention to the particular word which has been corrected, but always to read over, with care, the whole of the line in which that word is to be found. This is particularly necessary in cases where it has been requisite for the compositor to alter irregular or slovenly spacing; for in raising the line in the metal for that purpose, there is very great danger of some word or letter falling out, or some space being put into a wrong place.

In offices where more Readers than one are employed, it is always advisable that a proof-sheet should be read over by at least two of the Readers. The eye, in going over the same track, is liable to be led into the same mistake or oversight. The interest excited by the first or second reading having abated, a degree of listlessness, also, will steal upon the mind, extremely detrimental to correctness in the proof.

In all cases where the first proof has been found to be very foul, it is necessary to read the whole sheet a second time by copy. It is almost morally impossible that a foul proof should be cleared of all its errors, or that every omitted word should be noticed in the first reading. And when also it is considered that, in cases of *outs* or *doubles*, a compositor is as liable to make errors in the insertion of the one, and improper connexion in the removal of the other, as he was in the original composition and making-up of the sheet, the propriety of reading foul proofs a second time by copy will be obvious to every one.

When a proof-sheet has undergone the regular process we have here laid down, the next thing is, to forward it, along with the copy, to the author or editor of the work, or to such other literary person as the publisher has appointed for that purpose. But, in order to prevent disputes in case of delay, no proof should be sent to an author or editor without first writing on it the date of the month on which it was forwarded to him. A memorandum should also be made of the date of its return.

It ought always to be remembered, that the part of the copy which contains the connecting matter of the ensuing sheet, must either be retained, or carefully transcribed, or read off, a proof of that matter having been pulled for the purpose.

It may not be improper, in this place, just to take notice of the great danger to the correctness of a work which arises from the practice, too common with some authors, of keeping their proof-sheets too long in their hands, before they are returned to the printer. As the pages in the metal get dry, the adhesion of the types to each other is weakened, and the swell or extension of the quoins and furniture, which the moisture had occasioned, is removed; so that there is great danger of letters falling out, when a forme is long kept from the press. Nor is the danger which is hereby occasioned to correctness the only inconvenience: the impatience of authors to see their works in a fit state for publication is almost proverbial. The pleasure arising from beholding, as it were, " the form and texture" of one's thoughts, is a sensation much easier felt than described. That authors, therefore, may partake of this pleasure in a speedy and regular succession, they should make a point of forwarding their proof-sheets to the printer with as little delay as possible, not only that they may the sooner be got ready for press, but that the work may proceed in a regular manner, without being interrupted by the forwarding of other works in lieu of that, the proof-sheets of which are detained beyond the proper time in the hands of the author.

Authors are very apt to make alterations, and to correct and amend the style or arguments of their works when they first see them in print. This is certainly the worst time for this labour, as it is necessarily attended with an expense which, in large works, will imperceptibly swell to a serious sum; when, however, this method of alteration is adopted by an author, the Reader must always be careful to read the whole sheet over once more with very great attention, before it is finally put to press.

A proof-sheet having duly undergone this routine of purgation, may be supposed as free from errata as the nature of the thing will admit, and the word "Press" may be written at the top of the first page of it. This is an important word to every Reader: if he have suffered his attention to be drawn aside from the nature of his proper business, and errors should be discovered when it is too late to have them corrected, this word "Press" is as the signature of the death warrant of his reputation; and if he is desirous of attaining excellence in his profession, will occasion an uneasiness of mind which will but ill qualify him for reading other proof-sheets with more care and correctness. A Reader, therefore, should be a man of one business—always upon the alert—all eye—all attention. Possessing a becoming reliance on his own powers, he should never be too confident of success. Imperfection clings to him on every side!—Errors and mistakes assail him from every quarter! His business is of a nature that may render him obnoxious to blame, but can hardly be said to bring him in any very large stock of praise. If errors escape him he is justly to be censured—for *perfection is his duty!* If his labours are wholly free from mistake—which is, alas! a very rare case—he has done no more than he ought, and consequently can merit only a comparative degree of commendation, in that he has had the good fortune to be more successful in his labours after perfection than some of his brethren in the same employment.

In some printing-offices, the business of revisal for the press devolves upon the overseer; on many accounts this is proper and convenient; but no Reader should suffer his proofs to go to press, where there have been any very material errata, without their receiving a last inspection by himself. If he is doubtful of himself and diffident of his own powers of attention, how much more ought he to be on his guard respecting the care and attention of others! He should make it a rule never to trust a compositor in any matter of the slightest importance—they are the most *erring* set of men in the universe; and the attention of the overseer is liable to be interrupted by such a variety of causes and immediate demands, that he cannot always bestow the time and labour that is necessary in the revising a forme for press. In this final operation on a proof-sheet, the eye must be cast along the sides and heads of the respective pages, lest any letter should happen to have fallen out; any crookedness have been occasioned in the locking up of the forme; any battered letters have been inserted; or any *bite* from the frisket occasioned.

These are the qualifications of a Reader; this is the business of one employed as a Corrector of the press. It is an arduous employment—an employment of no small responsibility, and which ought never to be entrusted to the intemperate, the thoughtless, the illiterate, or the inexperienced.

[I cannot pass this opportunity of giving my unqualified approbation to the whole of this important Section, and have inserted it nearly as given in Stower. It was written by the Rev. Mr. Nightingale, author of "A Portraiture of Methodism," who at that time held the situation of Reader in a considerable Printing-office. The instructions given are enforced with such strong reasoning, that a master printer has only to model his readers upon such a plan, to ensure honour to his house from this *sine qua non* of good printing.]

THE ACCOUNT BOOKS.

CHAPTER XI.

*On the Mode of keeping the Accounts of a Printing-Office—The Work-Books—Warehouse-Book—*M*ASTER's* B*OOK.*

THE Printing profession has such a variety of peculiarities in its progress as to render the regular method of book-keeping, as taught for commercial purposes in general, of very little avail: a technical mode of keeping an account of the expenses paid in wages to compositors and pressmen for each work; of the proportionate addition calculated on the composition for the reading (which has also to cover warehouse expenses); and then another addition to answer for profit, expenses of material, and loss, are the principles upon which a printer must set out in his accounts.

Some very precise forms for keeping the workmen's accounts were laid down by Stower, planned both for book-work and job-work; but applicable only to the concerns of a house of small business, where the having a column to be headed with the name of each man who might happen to have been on a work, in which the pages he charged in each sheet were to be posted, and a similar arrangement as to the pressmen, would be practicable with small inconvenience and little loss of time.

An experience of more than thirty years in this department, which I have always reserved to myself, has convinced me that it is practicable to lay down a system by which the accounts of the largest offices may be kept so clear and concise, that, by opening only one book, the incidents necessary to be noted of any work, however large, may be seen at one glance, and its progress, to a single page, be ascertained every Saturday night. I do not think it at all material to know what pages in a sheet have been charged by compositors A, B, or C; or what formes by pressmen D or

E; the whole that is necessary is a registry of the pages and formes that have been paid for, so that no loss by overcharges shall be suffered.

After this general description I shall take up the matter more in detail, and minutely describe the books necessary according to my method.

First, the Work-books for the compositors and pressmen: in these they respectively enter their weekly bills, or charges, as briefly as possible, signed by their names; for instance:

A Compositor's Bill.

Annual Register, Vol. 53, Z 4, ^{2}A 6, ^{2}B 12
Correcting Do. X, 4 hours . . . .
Catalogue, B. C. and J. 8 p. Brevier . . .
Do. - - - 8 Nonpareil . . .
Do. Re-making-up, 8 hours . . . . .
Share of General Bill (A) . . . .
Ormskirk Inclosure Bill, share of . . . .
Job—Patent Pencils, 8vo page . . . .

J. B———

A Pressman's.

1000 Ann. Register, U 1*, X 2* . . . . .
5000 Catalogue, 1 forme . . . .
150 Bill, Ormskirk, A 2, F 2, I 1 . . .
2000 Job, Pencils . . . .
2000 Typographia, ^{2}G 1, ^{2}H 2 . . . . .

B——— and C———

Next—for the Warehouse. One book alone is necessary, as a rough day-book. The size I find most convenient is long foolscap, ruled faintly. Not the most trifling article should be *delivered* without a written order, if sent for, or signing a receipt if sent home, and then entering it in the day-book; this registers the *outgoings*. Equally necessary is it, that nothing should be *received* without invoice or bill of parcels, and entering in the book;

* *i. e.* Formes.

perhaps in some cases a slip written at the moment by the warehouseman may be substituted; this registers the *incomings*. These notes are then to be placed on a file. The entry in the book to be as short as possible; thus,

Monday, August 6, 1824.

From Messrs. Bleach and Cotton, 54 reams demy, on account of Messrs. Bind and Stitchall, for *(name of work)*
To Messrs. Longbill and Co. 104, Essay on Cash Payments.
— Mr. Square, 100 circulars.
From Messrs. Perfect and Co. 100 reams royal, on account of Messrs. Black and White.
Returned, Messrs. Gypsum and Retree, 2 reams demy left of Thoughts on Flax.

Every order for delivery, invoice for receipt, and other document to be carefully filed.

When any thing is sent home, the following form has been found most useful, the top part, as invoice, to be left; the bottom, as receipt, to be brought back.

182

M

Please to receive

N. B. The annexed RECEIPT to be returned (signed) by Bearer.

from your h. s.
T. C. Hansard.

§§

RECEIVED from Mr. T. C. Hansard,

for account of

(Signed)

This being done by the warehouseman as his proper duty, the master, or his clerk, may once a week, or at any more convenient time, call for the Warehouse-book and file, and into the proper columns of the book which I shall next describe enter every article, and then comparing the file-note, with the entry in the book, if found to correspond, signify that all is so far right, by crossing both with red ink; and then, dividing the notes into classes of "Bought"—"Delivery"—"Sale"—place them on separate files so designated.

I come next to the book the most important of all, and which I call the "Work Journal." This is so arranged as to comprise in itself all the particulars I have already stated, and many more; and in more than one instance has superseded a whole set of books kept in, or for, the warehouse.

The plan of this book is given in miniature at the end of this article. Each opening, or two opposite pages, form but one table, and are paged but as one. It is ruled red, with faint horizontal lines, rather close; and the entry I have given as an example will show that I have; 1st, As a cross head, the name of the work; 2nd, The date when begun, and name of employer; 3rd, Every particular as to type, measure, casting up, notes, corrections, extras, &c. forming the expense of compositors' work; 4th, The same of number printed, and press-work charges; 5th, Paper-account; from whom received, quantity used for the work, and balance on hand, or returned; 6th, The delivery of the work; 7th, The calculations of the charges to the employer, showing the whole expense of the work, to the point of entering it, in one line, into the Ledger. An index completes the arrangement.

Observation. Under the third head (to revert to a former part of this chapter, as to the mode of entering the compositor's charges) it will be found amply sufficient to post the pages charged in each signature, as they follow in each man's bill in the work-book; a single glance of the eye will show if more than 8, 16, 24, &c. pages are charged in the signatures: if any over-charges are made, the compositors themselves will soon find out who is in fault; and if any doubt occurs, a reference to their work-book can easily be made to decide it. If a sheet has been over-wrote, and the pages afterwards deducted, place them on the left as in signature E. The same of the pressmen's charges; by a single oblique line against the signature for one forme, another crossing it at right angles for the other (as B, D, E); one mark, like a root √ (as C and F), if the whole sheet is charged at once, will, with the aid, if required, of the pressmen's book, keep every account necessary for that department; cases may occur where the sheets, from particular circumstances, have to be charged in fractional parts, of which an instance is given in G.

The corrections can be entered against each sheet, as charged.

Pages charged at random, or where from circumstances they cannot be placed in the signatures to which they belong, are entered in a spare corner, and scratched off when placed and deducted.

A calculation of the price of any number of pages less than a sheet, entered just under the valuation per sheet, will afford much facility in checking the Compositors' book.

It would be folly to suppose my mode generally applicable to every peculiarity of business: it would be impossible to devise a plan that should be so; but I have seen some tolerably large concerns to which it is applied; and I have seen the books of others, totally inexplicable to any one but those who wrote them (and not very clear even to them), where it would have applied. Others may have superior methods adapted to their individual concerns; but I am venturing on the subject only with a view of information to those who may not have formed their own plans, and may think any information I can give worth attending to. I shall only add that, for Job work I have found the same columns equally applicable: for Parliamentary, or Bill work, a different appropriation of the columns may be necessary; but, in my judgment, I cannot conceive any possible cases in which I could not keep the accounts by the same form of entry.

Other accounts may be kept at the fancy or judgment of each individual. The weekly pay-list, where many are employed, may be formed into a book or sheet, of foolscap, to draw into each other: the private accounts, from a pocket-ledger to a regular cash-book, each one must keep according to circumstances; my business here is only with those necessary for the printing-office itself.

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1824.		£.	*s.*	*d.*	1824.	*Paper.*		1824.	*Delivery.*		*Calculations.*			
Jan. 8.	Small Pica, 8vo. . . . 23½ × 47 = 35,344													
	MS. leaded @ 5¾ = 16*s* 9½*d*. . .		17		Jan 24.	Bonsor . . .	8		Author . . .	1	Composing . .		19	0
SELF, RIB, & Co.	Notes		2		Aug. 10.	. . . .	49	Nov. 4.	B. C. J. . .	2	Reading . . .		5	0
	No. 1750 {1000 5*d*. 6 8 750 4½ 4 6} ⅌ Sheet . .	0	19	0				5.	. . . .	104		1	4	0
	11 2						57				P. & L. . .		12	0
	pp. s. d.					16 Sheets						1	16	0
	Corrections. 1 .. 1 2¼					1750 } 3½ Rms. }	56				Working			
	×B 2 6 8 0 1 6 2 .. 2 4½										3½ Rm. @ 7	1	1	0
	√C 3 1 5 7 0 1 0 3 .. 3 6¾				Nov. 6.	Returned . .	1							
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WAREHOUSE DEPARTMENT.

CHAPTER XII.

Of the Warehouse—Duties of the Warehouse-man—Giving out Paper, Hanging up, Taking down, Laying down a Gathering, Gathering, Collating, Folding, Pressing, Making up Waste, Booking.

The Business of a Warehouse-man.

THE warehouse department of a printer is a highly important part of his concern; the management of which involves his own credit, and materially affects the interest of his employers: it is therefore indispensably necessary to appoint a man for the management of it, who has been regularly brought up to the business; on whom the utmost reliance may be placed for sobriety and honesty, and who can be taught to feel and act upon the principle of making his master's, and his master's employers interest, the object of his constant solicitude. Those who have not such qualifications will be continually liable, through ignorance and carelessness, to fall into many serious mistakes; such as mixing papers belonging to different works, and thereby destroying the uniformity of them; giving or setting out the paper incorrectly, which must afterwards be made good by reprinting those sheets which are found to be deficient, or the sheet wanting is left out of a book here and there, and in this imperfect state the work is delivered to the bookseller, who, perhaps, if a large number has been printed of a slow-selling book, will be several years before he discovers the deficiency, and must make the demand of having his books perfected, after so long a time, under very awkward circumstances. These and many other reasons show the impropriety of employing persons in the warehouse not acquainted with its business. I must, however, observe, that the master or overseer should frequently look to the concerns of the warehouse, and see that the people employed there forward the different works with expedition, neatness, and accuracy.

Having made these observations, I shall now proceed to speak of the different stages of this department, and begin by supposing the warehouse to be quite clear, business coming in, and the warehouse-man just entering upon his office. He should first be provided with a book which is termed " The Warehouse-book." When the porter or carman brings paper from the stationer or bookseller, the warehouse-man will demand the bill of delivery, and see if it is right according to the invoice, before he signs the receipt, after which he will enter it immediately into the Warehouse-book.

In some houses it is thought necessary to keep a set of books in a warehouse: First, a Day-book, or Journal: secondly, an Employer's Paper-book, in which a place is allotted for every work, with a general index; and wherein the receipt, use, and balance of all papers are kept: thirdly, the Delivery-book; in this, also, a place is assigned for each work, with the number printed, and every delivery of the same, posted from the Day-book: fourthly, a book for the paper received and used on the master's private account: fifthly, Wetting-book: add to these, two or three others for particular accounts. I am, however, of opinion, that the fewer books left to the care of a warehouse-man the better, and have only one book in this department, as particularly described in the preceding chapter; which, with the assistance of the file, I find amply sufficient for posting every article to my own general book.

Having entered the receipt of the paper, the warehouse-man should then write on each bundle, with red chalk, the title of the book it is intended for, and remove it into a part of the warehouse most out of his way, or into a store-room kept for that purpose; observing to place it so as to take up as little room as possible.

Of giving or setting out Paper for the Press.

A BUNDLE of paper contains two reams—a ream of paper, *perfected*, consists of 516 sheets, or twenty-one quires and a half, twenty-four sheets to each quire. If not perfected, twenty quires to the ream, of which the two outside quires are called *corded* or *cassé*, as they are generally rubbed by the cording of the ream. These quires are by the paper-maker made up of torn, wrinkled, stained, and damaged sheets; not that the whole quire always consists of such sheets, some good or passable being generally found in looking them over. But the general custom now is, for booksellers and authors to send in their paper *perfect*. When, however, it is sent in imperfect, it is the warehouse-man's business to lay by the two outside quires, to cull them when most convenient, and to add the quires to make the bundle perfect. What he afterwards selects as passable of the sheets in the outside quires, he must take care to dispose of so that they may neither be at the beginning nor end, but about the middle of the volume; or to have them used wholly for jobs or proof paper; for they are seldom so perfect as the inside quires.

It is the general custom to print of every work what is termed an *even* number, either 250, 500, 750, 1000, &c. These quantities are set out for the wetter in *tokens:* viz. for 250 (sheets) one token, containing 10 quires 18 sheets; for 500, two tokens, one 11 quires, and the other 10 quires and a half; for 750, three tokens, two of them 11 quires each, and the other 10 quires 6 sheets; and for 1000, four tokens, three of them 11 quires each, and the other 10 quires. If a work is printed in half-sheets, it, of course, requires only half the above quantities.

As it will sometimes happen that other numbers different from the above are printed, it may be necessary to give some hints to warehouse-men on this head. In giving out fractions of a ream of paper for short numbers, some loss will necessarily arise in the division of the overplus. The twenty-one quires and a half of twenty-four sheets each, making 516 sheets, is ample allowance, (if the paper has been honestly supplied) for the overplus books expected by the booksellers, and for waste, in numbers amounting to 500. But since the tympan-sheets and register-sheets are equally used for either small or large numbers, an overplus proportionate to the above will seldom be found sufficient for numbers under 500. Hence, when paper is given out for smaller fractional numbers, an additional allowance must be made; or it will be difficult to make up even the proper number; since, according to this rule, the proportion of the sixteen sheets overplus in a ream, divided among ten sheets of 100 number each, would be only about three sheets; for 50 number, about a sheet and a half: whereas, in every case, one sheet for tympan, one or two for register, and as many more for incidents and accidents, would be absolutely necessary. Where strict attention is paid to the press-work, the men will be rather encouraged to throw out, and have paper to replace any they may discover in progress of work to be bad sheets, as soiled, torn, or spoiled in working; a work of even to the extent of 1000 number will seldom pass through an office, in which the exact proportion of the paper by reams will last out to the end of the reckoning. Indeed, so well are the most respectable booksellers convinced of the impolicy of being particular in this respect, that I have found them ever willing to grant any reasonable allowance. If they were not so, the consequences would be obvious upon reckoning the overplus books and waste. The printer, with regard to the paper account, as, indeed, in many other circumstances over which he has no control, is made the scape-goat of the sins of others. The paper is made up at the mill, passes through the hands of the stationer's men to be made *perfect*, and gets into the printer's warehouse-book upon an assumption, not bearing a doubt, that every ream contains 516 sheets! It is next to impossible for him to count the paper except by reams and quires; but instances frequently occur where an expert warehouseman, feeling out a very light quire, on counting it finds only eighteen or twenty sheets, and often an outside or cassé quire, which will be only nominally a quire; such instances are sufficient to clear a printer's conscience if, after due care has been taken, he cannot make up to the uttermost copy what he may wish and his employers may expect. Generally speaking, in numbers from 1000 to 2000, one over copy in each hundred is the least that should be made up—in larger numbers more, in proportion, may be expected.

It would be difficult to form any positive and invariable rule for the quantity to be given out for short numbers, as it must depend, in some degree, upon the quality of the paper. The more expensive papers, on which, generally, short numbers or fine copies are printed, must be given out more sparingly than common paper; and the tympan and register sheets be supplied by a more common sort, cut to the size of the finer.

For numbers up to 150, on ordinary paper, six sheets over will, generally speaking, be necessary. Thus, I should order for

25 number	1 quire	7 sheets
50	2	8
75	3	9
100	4	10
150	6	12
200	8	14
250	10	18

But if these fractions were added to even numbers, I should give out scarcely any overplus. Thus, a 250 has, in the share of the overplus of a perfect ream, by giving out 10 quires 18 sheets, got eight sheets over; therefore, for

275 I should only add 1 quire 2 sheets
300 . . . . . . 2 . . 3 . .
400 . . . . . . 4 . . 6 . . and so on:

the warehouse-man always bearing in mind to reckon for each 25, so many quires of 24 sheets, and the same number of sheets in the first instance, and then to add the necessary overplus.

In giving out paper for what are termed *jobs*, a little further observation will be necessary. It has been usual to give tables for this purpose, and the Printer's Grammar gave a very elaborate one, showing the quantity of paper to be given out for any job from 25 to 5000; and from two on a sheet to 128; but it was totally useless: it never could be acted upon: the calculation was made upon quires of 25 sheets, which never are found in a book or job office; so that if the directions of this table were followed in a case, for instance, where it gave the quantity as 11 quires, without attending to the above circumstance, the work would be found 11 sheets deficient.

The only way I have ever found practicable, has been, to try by division how many sheets are requisite for the purpose; for example, a job (label or any thing else) 750 number, 32 on a sheet, will require 24 sheets, which will give an overplus of 18. If this is not thought sufficient, a remnant or sheet more must be given out, calculating that where a sheet has to be cut into many parts, some further allowance must be made for accidents.

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32) 750 (23
    64
    —
    110
     96
     —
     14
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The overplus sheets being partly allowed for tympan-sheets, register-sheets, and other incidents; such as bad sheets, faults committed in beating, pulling, bad register, &c.; in any of these casualties the pressman doubles the sheet in the middle, and lays it across the heap as waste: for in case that sheet should run short of its proper number, the gatherer may chuse out the best of them to make good the deficiency. In setting out the paper, the warehouse-man lays each token with the folded side, or back part, one way, and the other token with the folded, or back side, the other way, that the wetter may distinguish the different tokens. When this is done, he writes a label, and puts it into the bundle, thus, *Guy's Spelling, Nov.* 7—or whatever may be the title of the book, that the pressman, when he takes up the heap, may not take the wrong one by mistake; and by this label, he can at all times ascertain how long the paper has been wet, and thereby know the state it is in for working.

Of hanging up Paper to dry.

WHEN the paper is worked off, the warehouse-man takes the heap and carries it to the room where poles are fixed for the purpose of hanging the sheets upon to dry, and this most generally is the appropriation of every room in a printing-office that has sufficient height for the paper, when hanging on the poles, to be out of danger from the workmen's lights. He lays the heap down on a stool, or table, of a convenient height, then takes the handle of the peel in one hand, and lays the top part down upon the heap, so that the upper edge may reach near the middle of the sheet; and, with the other hand, he doubles over so much of the printed paper as he thinks sufficient to hang up at one lift; which should be about seventeen sheets, as near as he can guess; or, if he has pole-room to hang them on, twelve, and down to six, according as he can allow time for drying. Some warehouse-men, to forward their work, will hang up a quire or more at a lift, which, through its thickness, keeps wet a long while, where it bears heavy on the pole; besides it often draws out turpentine from the wood, which leaves a yellow stain upon the paper. But supposing the poles well-seasoned, and not likely to stain, still it is hazardous, and ought on no account to be allowed. Some kinds of paper is much more liable to mildew than others, and particularly that part which rests on the pole, as it retains the water longer than the sides, which having the advantage of the air circulating between, get dry first.

Having thus doubled the first lift on the peel, he shifts the peel with his right hand, two or three inches towards the left, and then taking an equal quantity for another lift doubles that on the peel; and continues so doing till he has got as many lifts as the peel will carry; then he raises it, holding it aslant, that the shorter fold of the sheets may open from the peel, in order to convey them over the pole; and then drawing the peel from under, rests the lifts on the pole; and inserting one end of the peel so as to take all the lifts but one, he raises them so as to slide easily so far as to leave the next lift lapping about one inch over the first; proceeding in the same manner till he has disposed of all the lifts he carried up by that loading of the peel. He then, at his table, reloads, and proceeds as before. It will sometimes be necessary, where the end of a pole is exposed to any strong current of air, as a window, &c. to *lock* the last lift. This is done by folding a lift two or three times so as to concentrate its weight in a small compass, and hanging this over the last lift near the window it will generally prevent the air taking the sheets off the poles.

Of taking down the Sheets when dry.

WHEN the sheets are sufficiently dry, the warehouse-man takes his peel and brush, and with the peel begins with the last lift hung up, on account of the wrapper being with that lift; and continues to proceed to the other, in the reverse order to that of hanging them up, successively taking them down and brushing them, till he has finished the whole; taking care that he lays the single signature of each lift one over the other; if this is not done, it will occasion considerable trouble to turn them when they are to be collated.

There is also another way of taking the sheets down from the poles, which is, by laying the flat side of the peel against the edge of that lift which hangs over the other books, and pushing the peel forward, forcing them to slide, one doubling over the other, and so finishing the business with more expedition. But this method cannot be recommended, because the dust, which flies about while the sheets are hanging, must lodge on them, and by pushing them forward, is rubbed in, instead of being brushed off.

Of putting by the Sheets, or Signatures, when taken down.

When the heaps are taken down, the warehouse-man removes them to the warehouse, knocks them up, and puts them by in that part of the room where they will be most out of his way, till he has a sufficient number of signatures to form a gathering. But two or three sheets of each signature should be put by, in case the author, bookseller, or master, should want a copy of the work, or a specimen of as many sheets as are finished, before they are gathered. If this has not been done, and clean sheets should be wanted, he would then be obliged to lift every signature to get a sheet out of each, which will occasion a great loss of time, this may easily be prevented by reserving a few sheets as they are worked off.

Either the bookseller or author should be supplied, from time to time, with one copy of each sheet when printed, if from manuscript, in order to secure a copy from which to reprint in case of the calamity of fire. When he lays down the gathering, if such sheets have not been wanted, they are easily returned to their respective signatures.

Of laying down a Gathering.

To lay down a gathering, is to place the several heaps, with their signatures following each other, upon benches or forms of a proper height, beginning with the first signature of the body of the work, and laying it upwards, which is sometimes marked A, but in general B, placing it on the left end of the gathering-board with the length of the sheet before him, and the single signature (A or B) next him. He then follows with C, D, &c. laying them close to each other in the same position as the first, till he has laid down a sufficient number of sheets, which is commonly from B to M, unless the volume consists only of fourteen or fifteen sheets; in that case he may as well lay down the whole at once, rather than make two gatherings of them; he will then save himself the trouble of booking them: but where a volume runs through two or three alphabets, several gatherings must be made. In such cases, eleven or twelve sheets in a gathering is quite enough. The title, with signatures a, b, c, cancels, &c. if any, should be left till the last, and placed at the end of the gathering, so that, when folded, they may be found withinside.

Should the impression of each signature be so large as to cause the heaps, when laid down, to be too high for the boys, he must lay the gathering by bundles. Where pamphlets and small books are done, containing three or four sheets, they should be laid down three or four times, to the full length of the gathering-board.

Of Gathering.

THIS is the proper work of the warehouse boys, all working together: the art required in gathering chiefly consists in not taking up more than one sheet at a time, and following each other in rapid succession. They begin at the left-hand of the row; laying the left arm across the first heap, taking a sharp-pointed bodkin or needle in the right-hand, and with the sharp end of it, just touching the right-hand corner of the sheet, and raising the hand, lift up that corner, which is immediately received in the left, and is conveyed to the next heap, being particularly careful to place it even over the other, that there may not be much trouble in the process which is to follow; taking the second in the like manner as the first, and going to a third, fourth, &c. to the end; and then proceeding to *knock the gathering up;* viz. to make the sheets lie exactly even over each other; which is done in the following manner: a table being provided for this purpose, or one end of the gathering-board left clear, on which is placed a wrapper, they take the ends of the sheets between the thumb and fingers of each hand, and grasping them loosely, hold them upright, with the long side or edge on the surface of the table, then lifting them up about four inches high, they let them drop quickly through their hands, and catch them up again several times until they are quite even; for by these repeated jerks, those sheets which were above the rest are driven downwards, and those that were lower, upwards, and forcing the hands forward at the time of their falling causes them to be even at the sides; when they become exactly even, they lay them on a wrapper, and proceed gathering on as before, knocking them up, and placing them on the heap just gathered, with the single signature of each gathering lying successively one upon the other, still going on in the same manner, till they are piled to a convenient height. The pile is then covered with a wrapper, to keep the dust from soiling the top sheet, and thus accumulating, pile after pile, till the whole is finished. But, while gathering, attention must be paid in looking over the sheets, lest any should be torn, dirty, &c. and if any are found of that description they must be doubled up and put at the bottom of the heap they belong to.

The most general, and perhaps the most expeditious mode, is to use neither bodkin nor needle, but damp the end of the thumb with the tip of the tongue, and by this means lift up the sheets; but great care must be taken that the fingers are perfectly clean, or a number of sheets will be spoiled.

When the gatherers have worked till one of the sheets is deficient (for it would be an extraordinary circumstance for them to be just equal), they double up the odd sheets upon one another, cover them up with wrappers, and then put them by till collated.

Of collating Books.

THE warehouse-man takes some of the books which have been gathered, and puts them on a table or gathering-board, with the single signature before him, at his right-hand, and his left-arm across the heap; he then, with a sharp-pointed bodkin or needle, lightly pricks up the corner of the first sheet of the single signature, viz. A, or B, and with the thumb of his left-hand catches it up, and nimbly shifts it between the two fore-fingers of the same hand, that he may be ready with his thumb to do the same to a second, &c. for if he does not thus secure the sheets between his fingers, on receiving the next, the latter sheet would immediately fall back, and obstruct his view of the following signature. The collator cannot be too attentive in observing whether the gathering be true; that is, free from having two sheets of one signature; sheets turned the wrong way, or left out in the gathering, &c. and if he finds a sheet wanting or damaged, he may supply the defect from the heaps on the gathering-board, as it is the best and the most expeditious mode for the warehouse-man to go on with the collating at the same time the gathering boys are proceeding with the gathering. If duplicates have been gathered, he draws the overplus sheets from the rest, and lays them aside till he has collated the pile, after which he distributes them to their respective signatures.

Having collated a gathering, he lays it on his left, with a wrapper underneath, to keep the board from soiling the sheet; he then collates another, and puts that on the one just laid down, not even, but rather across it, that when he begins to fold, he may with ease distinguish each division, proceeding in the same manner till he has thoroughly examined the pile. Others again do not lay the gatherings down separately; but, when one is done, put the collated corner from them, and draw the next near them, and so proceed, moving each gathering backwards and forwards as they collate them; and when they have got a sufficient handful, turn them over, and keep going on as before, till the pile is finished. This way, if properly attended to, is the best, as it expedites the work, and answers the same end.

Of Folding.

Having collated the heap, or pile of gathered books, he proceeds to folding, which is performed in the following manner. The gatherings being on one side of him, he takes down one of the books from the rest, knocks it up on the board or table, and then keeps the single signature of the first sheet with its face downwards to the table, so that when he doubles it up, the last sheet will be folded inwards, and the first outwards. The manner of knocking the book up having been already described, a repetition of it here is needless; so, supposing the sheets exactly even one over the other, he lays the gathering flat on the table, and having hold of the ends, or sides, in his hands, doubles the right-hand hold over to the left; but before he relieves the end of the book from his right hand, he nimbly shifts it to his left, between the two fore-fingers of that hand, and then releases the other end from out of the right; by having it in that position, that is, with his fore-finger between the two folds, he can (though not doubled quite even) shift it which way he thinks proper, without discommoding any of the sheets.

It being now doubled up, and the edges placed exactly even over each other, he rubs the palm of his right-hand hard on the fold or back part of the book, that it may remain close together. When this is done, he lays it on the wrapper near him, and works on as before, observing to fold them as the work requires; viz. if twelves, in the long cross; and if folio, quarto, octavo, sixteens, eighteens, or twenty-fours, in the short cross.

Folding books is an important concern, and ought to be particularly attended to by the printer, because, if they are unevenly folded, the dust, by long standing, will work in, and soil those sheets that come out further than the rest, so that, when bound, they will have on the margin a border of dust, unless the binder cuts very deep, which must be allowed to deface the beauty of a volume. On the other hand, if the binder is nice in his work, and will not suffer a bad sheet to appear in it, he sends word that it is wanting, and it is very rarely that he sends back the damaged sheet, which impoverishes the waste, and is likewise an additional disgrace to the warehouseman for his negligence in not properly collating the books; and should it happen to be the sheet which is short in the gathering, a book must thereby be rendered imperfect, none of that signature being left to make good the deficiency. It is necessary here to observe, that though books seem apparently uneven, it is not always owing to the folder's negligence; therefore, before blame can properly be attached to him, the books should be examined; because, though the quality of the paper has been attended to by the purchaser, yet perhaps nicety respecting the size may not have been so much regarded by him, so that some of the sheets in a volume, or gathering, are frequently found to differ half an inch in size, particularly since the introduction of machine-made papers.

In some paper the sheets run equal enough as to size, but are not square; and if, in such cases, folios, quartos, octavos, or sixteens were to be folded with the two bottom corners even together, they would be extremely uneven; therefore the best that can be done, when it so happens that the sheets run in this unsquare manner, is to knock them up well, and fold them so that they may at least be brought even at the middle of their outer margins; then the outer margin of each side will share the defect alike.

When sheets are flimsy, which is sometimes the case, the more the folder knocks them up the worse they are, for the knocking them up only batters their edges, instead of bringing them even; therefore, before they are folded, the uneven sheets must be pulled even, and then gently knocked up.

Of counting out and pressing of Books.

HAVING folded a parcel, or the whole of the gathered books, the warehouse-man proceeds to count them out into proper quantities, according to the thickness of the gathering: if very thick, only five; if thin, ten, fifteen, twenty, or twenty-five, nay, sometimes fifty, according to their thickness, and observes to keep the same number in the count of each different gathering throughout the work. He then lays them flat on the table, and gives them a blow or two with the palm of his hand on the folded or back side, to make them lie close; after which he gently knocks them up even, and puts them in the standing press, if empty; if not, in a convenient place, on a wrapper, or waste sheet, till the press is disengaged, with the fold or back side of the first parcel one way, and the second quantity of books with the folded side or back the other way, continuing, in the same manner, to put them on one after the other, till the press will permit no more in height. He then proceeds to pile up, range by range, till full, observing that each range contains an equal quantity of books, and stands in a right parallel, so that when they are screwed down they may all receive an equal pressure; the reason why he is particular in reversing the edges of each portion is, that if he did not, it would be impossible to pile them up straight with their backs to lie all one way: for, in printing, if the matter does not run close and even alike, but, on the contrary, some pages are loose and open, and others close, the open pages receiving a deeper impression than the close, make that part of the sheet swell, while the remaining ones lie closer; therefore, were a number of books to be piled, before pressing, with their backs one way, they would be raised up at one end, and consequently would soon slide down; which inconvenience is remedied by reversing them; for, turning the thick end on the thin, they are brought to lie level; besides which, their number then can the more readily be told.

The press being full, the warehouse-man takes the short pin belonging to it, and screws it down as low as he can, after which he takes a strong iron bar, about five or six feet in length, and with it works the screw of the press round with all his force as tight as he possibly can, then calling for the assistance of others in the warehouse, the pressure is finally completed, and the books remain in it from 12 to 24 hours. Where an hydraulic press is used, the screwing-down process is of course changed for the pumping. The pressure acquired is so great in these presses, that they may be charged and discharged three or four times in the day. He then takes them out of the press, and piles them up against the sides of the room, or in stalls, if the house is so fitted up, covering them neatly and closely with a wrapper under and over, so that the dust may not easily penetrate. A label is then attached to the pile, on which is expressed the title of the book, and how many the parcel contains. Should the impression be more than the press will admit of at once, it is filled up again in the like form as before, and so continued till the whole is completed.

If the impression is not very large, and will make only a few bundles, or is expected to remain some time under the charge of the warehouse-man, he ties them up into bundles, laying a wrapper under and over each, and having written the title and the number of books in the bundle on the upper wrapper, he puts them aside in the store room, or some convenient part of the warehouse, that he may have free access to deliver them out according to order. As soon as the books are finished, he acquaints the author or bookseller that the whole of the impression is ready for delivery.

Of making up the Waste.

After the books have been collated and folded, and the duplicate sheets that were drawn out distributed, he takes the last signature first, and shaking the spoiled or doubled-up sheets out, if any, from between the others, he lays the overplus clean sheets flat on the table, with the single signature towards him, and opens the doubled or spoiled sheets, and places them on the former with the signature the same way. This done, he turns them over; knocks them even; folds them; and puts them near him, with the single signature upwards. He then takes the sheets that lie next to the signature he has just folded, and does the same to that, placing it on the other, and continuing till he has finished the whole; after which, he presses and ties them up together, and writes on the bundle the title of the book; also which sheet is deficient. They are then put in a proper place, whence they may be easily taken when wanted. But it must be observed, if there should be, amongst the sheets distributed, any of the signature that was short, he gathers again, till that, or some other sheet is deficient, collating and folding them, and putting them with the other books.

Of booking the different Gatherings.

When a volume runs through several alphabets, it must consequently make more than one gathering; therefore to put the different gatherings together in regular succession to make a complete volume, the warehouse-man takes as many counts of the first gathering as he can conveniently carry, and lays them on the place where they are intended to be booked. He then lays a wrapper on the gathering-board, and takes the first count of reversed parcel, which he places on it, with the single signature upwards; a second quantity is then laid down in the same way, with their backs one on the other, and placed so that the end of one of the parcels may project outwards, while the end of the other is turned inwards: thus he continues piling them in this distinct manner, till he has got them sufficiently high. After this is done, the second gathering is placed by the side of the first, with their outer margin against the backs of that gathering, and piled up in the same manner, till it contains the same number of gatherings as the first parcel.

If a book makes more than two gatherings, they are laid down one after the other, as before observed. The utility of laying down each count, so that they may project a little over each other, will be readily perceived; for should he take two gatherings of one sort, or let one slip from his fingers unperceived (which is not improbable where there is a number of gatherings in a volume) on their being placed in this manner, he quickly discovers his error by their not running equal at the end of every count. If he does not lay them in this manner, a mistake of this sort will not be detected till he comes to the bottom of each gathering; and then to rectify the error will be attended with much trouble. When he has laid down some of each gathering, he proceeds to book them, which is done by taking one from each parcel, beginning with the first; he then knocks them even, and places them on a wrapper, reversing each book. They are afterwards tied up in bundles, or piled away in a convenient part of the warehouse, with a wrapper under and over, and a label in each pile. If some odd gatherings are left (which is highly probable), they are then added to the bundle of waste, and a memorandum made of it on the upper wrapper.

PRICES.

CHAPTER XIII.

Journeymen's Wages—Price-scale of 1785—*Subsequent Advances and Regulations—Charges to the Booksellers and Employers—Comparison of Expenses, Wages, Charges, and Profits—Warehouse—Cold-pressing with glazed Papers—The Hydraulic Press.*

IN the early stages of the printing business the mode of paying the workmen employed in it must have been similar to those of every other business or manufactory in its infancy; viz. on established daily wages. The idea of paying as for piece-work was not suggested for nearly two centuries after the discovery of the art.

It is now the general practice to pay the composition work by a calculation of the number of thousand letters which the compositor has to pick up: this is calculated by taking the width and length of the page in the letter m of the type in which it is set; assuming that the average width of each type is half an m (or an n) the measure (or width of the page) is doubled, and then multiplied by the ms in length:* this cannot always be calculated by merely the number of lines appearing upon paper, because if space lines, or leads, are used, they form part of the measure of length; therefore, the ms are laid down the side of a page, and the length thus correctly ascertained.

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* As for example—[see p. 761] the page is 23 ms and an n wide, and 47 long 23½
multiplied by 2
gives 47 ns wide
multiplied by 47 ms long
329
188
gives 2209 letters in a page
multiplied by 16 pages in a sheet
13254
2209
Total 35344 letters in a sheet, which (see Article 1), of the scale, count as 35 thousands; and this, if manuscript leaded, is 5¾*d.* equal 16*s.* 9¼*d.*: this counts as 17*s.*

This may vary in price per thousand, and receive certain additions according to circumstances explained in the rules.

The pressman's work is valued by the number of sheets which he prints, but calculated by two hundred and fifties, or half-reams.

These principles, regulated by various modifications and provisions, according to peculiar circumstances, fully explainedin the price-scales hereafter inserted, form the ground-work of all calculations of journeymen's wages and masters' charges, in the printing business.

Compositors' Prices.

Moxon, my oldest authority in printing, is silent upon the subject. As far back (previous to 1785) as I have been enabled to trace any fixed price, it appears that composition was paid in some degree according to the size of the type used; upon the very rational principle, that a compositor had much less interruption in the actual operation of composing, or picking up, his thousands, when working upon small type, than he would have when upon large, by the more frequent making-up, imposing, correcting, &c. &c. Thus, English type was at one period paid at four-pence, Long Primer three-pence half-penny, Brevier three-pence farthing. In Edinburgh, about fifty years ago, Brevier was two-pence halfpenny, while English was four-pence per thousand.

The first regular trade scale was settled, after much labour and discussion, by a committee chosen from the body of masters, in November 1785. This scale has continued as the basis of all others to the present time. Previous to 1785 the price paid per thousand was generally, in town, four-pence. The composition scale was then formed upon an advance to 4½*d.* per thousand, being an addition of 2*s.* 6*d.* in the £. or 12½ per cent, and certain prices were given for other languages than English, for dictionaries, &c. &c. which had previously been at no settled ratio. In May 1793, it was agreed to include in the measurement of the page, the lines for heads and signatures. In December 1795, a regulation was made relative to works in type larger than English. In November and December 1800, a considerable rise was granted, viz. of three-farthings in the thousand (making it 5¼) "in consideration of the extreme and increasing pressure of the times, the article of bread having risen to the unusual price of 1*s.* 7½*d.* the quartern loaf." In February 1805, a general adjustment of the scale took place, consisting of 27 articles or definitions, but this gave no advance on the general mode of casting up the work. In April 1810, a more important alteration took place in the scale, by admitting a distinction of leaded and solid work; this was further amended in 1816 by the regulations relative to reprints.

As this scale, thus amended and modified, is the established rule by which the work of compositors is now paid, it will be inserted, but I shall first endeavour to show, in a tabular form, the origin, progress, and proportions of the present prices.—[See opposite page.]

Trade Scale of Prices for Compositors and Pressmen.

SCALE OF PRICES FOR COMPOSITORS' WORK,

Agreed upon at a General Meeting of Master Printers, held at Stationers' Hall, April 16, 1810*; and altered as to* Reprints *in* 1816.

ART. 1. ALL Works in the English language, common matter, *with space lines,* including English and Brevier, to be cast up at 5¾*d.* per 1000; if in Minion 6*d.* per thousand; in Nonpareil 6¾*d.* *Without space lines,* including English and Brevier, 6*d.* per 1000; in Minion 6¼*d.*; in Nonpareil 7*d.*; in Pearl, *with or without space lines,* 8*d.*; Heads and Directions, or Signature lines, included. A thick space to be considered an [n] in the width, and an [n] to be reckoned an [m] in the length of the page: and where the number of letters amounts to 500—1000 to be charged; if under 500, not to be reckoned: and if the calculation at per 1000 shall not amount to an odd threepence, the odd pence to be suppressed in the price of the work; but where it amounts to or exceeds threepence, there shall be sixpence charged. [m] and [n] quadrats, or whatever is used at the beginning or end of the lines, to be reckoned as an [m] in the width.

2. Works printed in Great Primer to be cast up as English; and all works in larger type than Great Primer, as half English and half Great Primer.

3. All works in foreign languages, though common type, *with space lines,* including English and Brevier, to be cast up at 6¼*d.* per 1000; if in Minion 6¾*d.*; Nonpareil 7½*d.* *Without space lines,* including English and Brevier, 6½*d.*; Minion 7*d.*; Nonpareil 7¾*d.*; and Pearl, *with or without space lines,* 8¾*d.*

4. English Dictionaries of every size, *with space lines,* including English and Brevier, to be paid 6¼*d.*: *without space lines* 6½*d.* (In this article are not included Gazetteers, Geographical Dictionaries, Dictionaries of Arts and Sciences, and works of a similar description, except those attended with extra

TABLE *to show the* ADVANCE *in the* PRICE *of* COMPOSITORS' LABOUR, *from* 1785 *to the Regulation of* 1810.

	Price of Composition previous to 1785.	Advance of Nov. 20 1785.	Regulation of May 11, 1793.	Regulation of Dec. 18, 1795.	Advance of Nov. 29 and Dec. 24, 1800.	Regulation of Feb. 1805.	Advance of April 1810.	Total of Advances.	Reduction of Jan. 16, 1816 (on Reprints only.)
		Advance to	Gave the Heads and Directions.	Works in larger Type than English to be paid as English.	(Bread 1s. 7½d. Quartern Loaf—expected *halfpenny* on MS.) gave *three-farthings throughout* — viz. advanced from 4½d. to	The Scale of xxvii Articles formed.		per cent. 1785.. 12½ 1793.. 10 1800.. 16¼ 1810.. 12½	
Including English and Brevier....	4d.	4½d.	- - -	- - -	5¼d.	5¼d.	5¾d. leaded	- - -	5d.
							6d solid	- - - 51¼	5¼d.
Foreign....	- - -	5d.	- - -	- - -	5¾d.	5¾d. including Eng. Dictionaries.	6¼d. leaded	- - -	5½d.
					Bourgeois or Brevier 6d.		6½d. solid	- - -	5¾d.
Dictionaries in two Languages, or Foreign....	- - -	5d.	- - -	- - -	5½d.	6d.	6½d. leaded	- - -	5¾d.
					Duodecimo, or Eighteens, 6d.		6¾d. solid	- - -	6d.
		About 12½ per cent. 2s. 6d. in £.	About 10 per cent. 2s. in £.		About 16¼ per cent. 3s. 3d. in £.		About 2s. in £. & 3s. in £. Average 2s. 6d. in £. 12½ per cent.	12½ 10 16¼ 12½ 51¼ per ct.	

trouble beyond usual descriptive matter.) Dictionaries of two or more languages, of every size, *with space lines*, including English and Brevier, to be paid 6½*d.*; *without space lines*, 6¾*d.*; if smaller type than Brevier, to take the proportionate advance specified in Article 1.

5. English Grammars, Spelling Books, and works of those descriptions, in Brevier or larger type, *with space lines*, to be paid 6*d.* per 1000; *without space lines* 6¼*d.*: if in two languages, or foreign language, *with space lines*, 6¼*d.*; *without space lines*, 6½*d.*

6. Small-sized Folios, Quartos, Octavos, and works done in Great Primer or larger type (English language), which do not come to seven shillings when cast up at the usual rate, to be paid as follows: English, and larger type, not less than 7*s.*; Pica 8*s.* 6*d.*; English 12mo. to be paid not less than 10*s.* 6*d.*; and Pica not less than 11*s.* 6*d.* per sheet.

7. Reviews, Magazines, and works of a similar description, consisting of various-sized letter, if cast up to the different bodies, to be paid 2*s.* 6*d.* per sheet extra.

8. Pamphlets of five sheets and under, and parts of works done in different houses, amounting to not more than five sheets, to be paid 1*s.* per sheet extra; but, as it frequently occurs that works exceeding a pamphlet are often nearly made up without a return of letter, all such works shall be considered as pamphlets, and paid for as such.

9. Works done in Sixteens, Eighteens, Twenty-fours, or Thirty-twos, on Small Pica and upwards, to be paid 1*s.* 6*d.* per sheet extra; if on Long Primer or smaller type, 1*s.* per sheet extra. Forty-eights to be paid 2*s.* per sheet extra, and Sixty-fours 2*s.* 6*d.* per sheet extra.

10. Works requiring an alteration or alterations of margin, to be paid, for each alteration, 1*s.* per sheet to the Pressmen if altered by them, and 6*d.* to the Compositor, as a compensation for making up the furniture; if altered by the Compositor, then he is to be paid 1*s.* for the alteration, and the Pressmen 6*d.* for the delay.—This article to be determined on solely at the option of the employer.

11. Bottom Notes consisting of twenty lines (or two notes, though not amounting to twenty lines), and not exceeding four pages in every ten sheets, in quarto or octavo:—one page (or two notes, though not amounting to one page), and not exceeding six pages, in twelves:—two pages (or two notes, though not amounting to two pages), and not exceeding eight, in Eighteens or above, to be paid 1*s.* per sheet; but under the above proportion no charge to be made. Bottom Notes, consisting of ten lines (or two notes, though not amounting to ten lines), in a pamphlet of five sheets or under, and not exceeding two pages, to be paid 1*s.* per sheet extra. Quotations, Mottos, Contents to Chapters, &c. in smaller type than the body, to be considered as Notes. [Where the notes shall be in Nonpareil or Pearl, in Twelves, the number of pages to be restricted to four; in Eighteens, to five pages.]—This article is intended only to fix what constitutes the charge of 1*s.* per sheet for Bottom Notes: all works requiring a higher charge than 1*s.* for Bottom Notes are to be paid for according to their value.

12. Side Notes to Folios and Quartos, not exceeding a broad quotation, if only chap. or date, and not exceeding three explanatory lines on an average in each page, to be paid 1*s.* per sheet: in Octavo, if only chap. or date, and not exceeding three explanatory lines on an average in each page, 1*s.* 6*d.* per sheet. Cut-in Notes, in smaller type than the body, to be paid for in a similar manner.—Side and Bottom Notes to many, particularly historical and law works, if attended with more than ordinary trouble, to be settled between the employer and journeyman.

13. Greek, Hebrew, Saxon, &c. or any of the dead characters, if one word and not exceeding three lines in any one sheet, to be paid for that sheet 1*s.* extra; all above to be paid according to their value.

14. Greek *with space lines*, and without accents, to be paid 8½*d.* per 1000;

if with separate accents, 10*d.*: *without space lines*, and without accents, 8¾*d.*; with accents, 10¼*d.*; the asper not to be considered an accent. [If Dictionary matter, to take one halfpenny advance.]

15. Hebrew, Arabic, Syriac, &c. to be paid double: Hebrew with points to be cast up as half body and half points doubled.

16. Music to be paid double the body of the sonnet type.

17. Index matter, though but one measure, to be paid 2*s.* per sheet extra.

18. Booksellers' Catalogues (in whatever language) to be cast up at 7*d.* per 1000, not including the numbering.

19. Night-work to commence and be paid for, from ten o'clock till twelve, 1*s.*; all after to be paid 3*d.* per hour extra till six.—Morning-work, commencing at four o'clock, to be paid 1*s.* extra.—Sunday-work, if not exceeding six hours, to be paid for 1*s.*; if for a longer time, 2*d.* an hour.

20. Jobs of one sheet or under (except Auctioneers' Catalogues and Particulars) to be cast up at 7*d.* per 1000: if done in smaller type than Brevier, to take the proportionate advance specified in Article 1; if in foreign language, of one sheet or under (except Auctioneers' Catalogues), to be cast up at 8*d.* per 1000; if done in smaller type than Brevier, to take the proportionate advance specified in Article 1.

21. Where two pages only are imposed, either opposite to, or at the back of each other, they shall be paid for as two pages; but if with an indorse, or any other kind of matter constituting a third, then to be paid as a sheet, if in Folio; a half-sheet, if in Quarto, and so on.

22. Broadsides, such as Leases, Deeds, and Charter Parties, above the dimensions of Crown, whether table or common matter, to be paid the double of common matter; on Crown and under, to be paid one and one half common matter. The indorse to be paid one fourth of the inside page, as common matter.

23. All corrections to be paid 6*d.* per hour.

24. The Imprint to be considered as two lines in the square of the page.

25. Different volumes of the same work to be paid for distinctly, according to their value.

At a Meeting of MASTER PRINTERS *held January* 16, 1816, *for the purpose of taking into consideration the state of the Trade in general, in consequence of the alteration of the Times:*

It was the opinion of this Meeting, that it would be highly expedient that, after the 19th of February, the following modification of the Compositors' Scale of Prices of 1810, as far as regards Reprints, and of the Pressmen's Scale of Prices, as far as regards all Numbers exceeding the first 1000, should take place. In the Compositors' Scale, all Reprinted Works to be paid three farthings per 1000 less than the Scale of 1810. All Manuscript or Original Works shall continue to be paid for as at present. In the Pressmen's Scale, every Token above the first four Tokens to be paid one half-penny per hour less than the Scale of 1810.

At a Meeting of the Committee of MASTER PRINTERS *held March* 11, 1816,

It having been stated that doubts had arisen in the minds of several Masters as to what should be considered "Reprinted Works,"—Resolved, That they be informed that, under the above Resolutions, all "Reprinted Works" were meant to be comprehended, whether printed sheet for sheet or otherwise; it being understood, that, in cases where the copy is rendered peculiarly troublesome by intricate manuscript insertions, a reasonable allowance may be made for the same to the Compositor.

ABSTRACT OF THE SCALE.

—			COMMON.	FOREIGN	DICTIONARIES		GRAMMARS, &c.		GREEK	
					English	Two Languages or Foreign	English.	Two Languages or Foreign	Without Accents.	With Accents.
			d.	d.	d.	d.	d.	d.	d.	d.
MANUSCRIPT.—1810.	English to Brevier.	leaded.	5¾	6¼	6¼	6½	6	6¼	8½	10
		solid. .	6	6½	6½	6¾	6¼	6½	8¾	10¼
	Minion . .	leaded.	6	6¾	6¾	7				
		solid. .	6¼	7	7	7¼				
	Nonpareil .	leaded.	6¾	7½	7½	7¾				
		solid. .	7	7¼	7¾	8				
	Pearl .	leaded or solid.	8	8¾	8¾	9				
REPRINT.—1816.	English to Brevier.	leaded.	5	5½	5½	5¾	5¼	5½	7¾	9¼
		solid. .	5¼	5¾	5¾	6	5½	5¼	8	9½
	Minion . .	leaded.	5¼	6	6	6¼				
		solid. .	5½	6¼	6¼	6½				
	Nonpareil .	leaded	6	6¾	6¾	7				
		solid. .	6¼	7	7	7¼				
	Pearl .	leaded or solid.	7½	8	8	8¼				

Notes constituting the charge of One Shilling per Sheet.—See Article. 11.

4to. and 8vo. 20 Lines or 2 Notes } in 10 Sheets.
12mo. . . . . . . 1 Page or 2 Notes }
18mo. or above 2 Pages or 2 Notes, in 10 Sheets.
Pamphlets. . . . 10 Lines or 2 Notes, in 5 Sheets.

Parliamentary work is paid upon a scale somewhat higher than the above upon account of the hurry and exertion required; and that is again divided into *Private Parliamentary Work* and *Public Parliamentary Work;* the former being at seven-pence per thousand, the latter at sixpence-halfpenny.

Cases in the Privy Council or House of Lords, &c. are paid more by custom than valuation; as

	£.	s.	d.
English per sheet	0	14	0
Pica	0	17	0
Small Pica . .	1	0	0

Side Notes are an addition of 5*s.* per sheet.

The regular width is 40 Pica ms: length in English, 68 lines; Pica 77: Small Pica 88: exclusive of heads and catch lines.

The number required for the Privy Council is from 80 to 100: for the Lords always 500.

The job-masters came to certain resolutions, as more specifically applicable to their peculiar line of business, but these rules have been very nearly embraced by the above scale, excepting the following definition " of jobs having two or three head-rules, and four columns, to be considered tabular; all above to be reckoned table work. The first to be paid one and one-half, the second double price."

The proposition for the classification of work in the compositors' scale, as relating to a distinction between manuscripts and reprints, was first brought forward in the trade meetings of 1810, by the writer of this chapter. He had long felt convinced that a graduated scale, to meet the various classes or qualities of work, and to equalize the rate of payment according to the various abilities of the workmen—to make a distinction between those works which might, from the ease of their execution, be given to apprentices and inexperienced hands, and those which, from their more difficult nature, would be allotted to the most expert and experienced—to keep that kind of work in the metropolis which, from its easy nature, could alone be sent away to distant country printing offices, that we might have something left for the employ of our young or aged, lame or indifferent hands—that, to effect all these purposes, a distinction ought to be made between *original, or manuscript works—print copy, but not exactly reprint works*—and *precise reprints, line for line and page for page.*

However, the committee, by a small majority, decided against him; and not thinking the question had been fairly met, he seceded from the trade-meetings altogether, and formed a scale of his own. The practice of six years showed so far the equity of the principle, that "the Committee," by the resolutions of 1816, adopted, but only in a partial degree, the principle for which he had contended, although the proposition made in a meeting, Dec. 24, 1810, to this effect, had been met by the following amendment:—"That the meeting are convinced that, to make any distinction between manuscript and reprint would be an unjustifiable departure from the established and long-approved principles by which works have been appreciated."

The two scales were thus brought so very near to each other, that, had as much been conceded in 1810, but little difference would have remained. Still some points, which by several of the best experienced masters of the trade who honoured me with their support, were acknowledged to be essential towards a more perfect distinction of works, remained undefined in one scale, but clearly pointed out in the other. The *general* distinction of *leaded* and *solid* by which the former, as low down as Nonpareil, is paid less for than *solid,* must evidently be erroneous where very thin leads are used, since those of eight down to fourteen to Pica can be no advantage to a compositor.

Previous to 1793, custom had made a most unreasonable demand upon a compositor's time by obliging him to set the head-line, the white or leads after it, and the signature and direction line, for nothing: the request for abolishing this custom was perfectly reasonable, and, indeed, the readiness with which it was conceded by the masters, showed their sense of the hardship. No employers of a printer could argue against the propriety of paying for the full extent of the pages, as they appeared on the paper; but no such reasoning would apply to the paying for "m and n quadrats, or whatever is used at the beginning or end of lines." This is entirely a concern of the printing-office materials: there may or may not be leads to make the exact measure required; but this, since the charges are regulated by what is paid for the composition, ought not to affect the employer; it might be of serious consequence to a master printer in cases of estimating works conscientiously by what he paid his men, for supposing A to have no leads to make the required measure without using m quadrats, B to use n quadrats, and C to have leads the exact measure, a difference of two, three, or four shillings a sheet might appear in the prices, and it would be difficult to make any one understand the reason of the difference, since there is nothing which appears in print to authorize it. The scale below embraces all the first 5 articles, the 7th, 13th, 14th, 15th, 17th, 20th, 23rd of the scale above; adopting, in few lines, as minor regulations, articles 6, 8, 9, 10, 11, 12, 16,18, 19, 21, 22, 24, 25.

SCALE FOR COMPOSITORS' WORK.

T. C. HANSARD, April, 1816.

		Reprints. (*a*)	Print Copy. (*b*)	Manuscripts. (*c*)
English to Brevier, inclusive	Not leaded	5¼	5½ (*d*)	6
	Leaded (*c*)	5	5¼	5¾
Minion [*body half English*]....	Not leaded	5½	5¾	6¼
	Leaded..........	5¼	5½	6
Nonpareil [*half Pica*]	Not leaded	6¼	6½	7
	Leaded..........	6	6¼	6¾
Ruby [*half Small Pica*].........................		7¼	7½	8
Pearl [*half Long Primer*]........................		8	8¼	8¾
Diamond [*half Bourgeois*]..........		9	9¼	9¾

DEFINITIONS.

(*a*) Line for Line, Page for Page.

(*b*) A Work having been printed before, but now either in another sized Type, Page, &c. or so corrected as to cause new making up throughout.

(*c*) Or Copy so various or corrected as to be equal to MSS. in trouble.

(*d*) Any doubt as to which Class a Work may belong, can be settled by taking the intermediate farthing.

(*e*) Leads not to be accounted of any advantage if less in thickness than six to Pica; but m or n quadrats, &c. used on account of the leads, not to be reckoned in casting up.

Additions to the above.

Foreign Language, add	*d.*½
English Spelling Books or Grammars, and Works of similar description, add	¼
Same in two or more Languages, or Foreign, add	½
Dictionaries, Indexes, or similar, add	½
Ditto, English with other Languages, or all Foreign, add	¾
Reviews, Magazines, and Works of a similar description, consisting of various sized letter, if cast up and paid to the different bodies, add	½
Jobs (except Auctioneers' Catalogues and Particulars) one Sheet, or under, add	1

Either with or without Leads.

Greek	add, *one half.*
If separate accents, (not considering the asper as an accent)	add, *three-fourths.*
Hebrew	*double.*
If with points, *half body and half points, and*	*double.*
Table-work	*double.*
Tabular	add, *one-half.*
Parliamentary and Government Offices Work	add, *one penny.*

Corrections to be paid at 5½*d.* per hour.

EVERY compositor should keep a private work-book, in which to enter an account of the number of pages he has composed, charged, &c. The first part should be precisely the original from which he copies his weekly bill into the general work-book, the usual form of which has been already given in page 757. At the latter end of the book he should draw out a table for each work he is upon with others, in order to prevent disputes concerning the pages written, or the imposing; the following form will be found useful:—

TITLE OF THE WORK.							
Sig.	Set.	Wrote.	Imposed.	Sig.	Set.	Wrote.	Imposed.
B	6	8	1 forme.				
C	8	6	1 forme.				
D	14	12	1 forme.				

SCALE OF PRICES FOR PRESS-WORK,

Agreed upon at a General Meeting of Master Printers, held at Stationers' Hall, Feb. 8, 1810; *with the Alteration agreed on in* 1816, *and as specified in the Fourth Column annexed.*

	1810.			Modification of 1816.
	250	500 and 750	1,000	Every Token above the first Four.
FOLIOS:—on medium or demy.				
Not exceeding 52 Pica Ems [in the width of the page] upon Small Pica and upwards	*d.* 6	*d.* 5½	*d.* 5	*d.* 4½
If on Long Primer, Bourgeois, or Brevier	7	6	5½	5
All above 52 Pica Ems, upon Small Pica and upwards	7	6	5½	5
If on Long Primer, Bourgeois, or Brevier	7	6½	6	5½
Long Primer and upwards, on Copy or Crown	6	5½	5	4½
QUARTOS:—on medium or demy.				
Not exceeding 40 Pica Ems, upon Long Primer and upwards	6	5½	5	4½
If on Bourgeois or Brevier	6	5½	5½	5
All above 40 Pica Ems, and not less than Long Primer	7	5½	5½	5
If on Bourgeois or Brevier	7	6	6	5½
Brevier and upwards, on Copy or Crown	6	5½	5	4½
OCTAVOS:—on medium or demy.				
Not exceeding 24 Pica Ems, upon Small Pica and upwards	6	5½	5	4½
If on Long Primer, Bourgeois, or Brevier	7	5½	5	4½
All above 24 Pica Ems, on Brevier or upwards	7	6	5½	5
If less than Brevier	8	6½	6	5½
Brevier and upwards, on Copy or Crown	6	5½	5	4½
TWELVES:—on medium or demy.				
Not exceeding 21 Pica Ems, upon Long Primer and upwards	7	5½	5	4½
If on Bourgeois or Brevier	7	6	5½	5
All above 21 Pica Ems, upon Long Primer and upwards	8	7	5½	5
If on Bourgeois or Brevier	8	7	6	5½
Long Primer, Bourgeois, or Brevier, on Copy or Crown	7	5½	5	4½
EIGHTEENS.				
If not less than Small Pica	7	5½	5	4½
If on Long Primer, Bourgeois, or Brevier	7	6	5½	5
If less than Brevier	8	7	6	5½
TWENTY-FOURS and THIRTY-TWOS.				
If not less than Small Pica	7	6	5½	5
If on Long Primer, Bourgeois, or Brevier	8	7	6	5½
If less than Brevier	9	8	6½	6
POCKET BOOKS.				
OCTAVO.—Post or Crown, 21 Pica Ems wide, 35 long	7	6	5	4½
TWELVES. Pot, such as Lady's and Christian Lady's. Table Part, 6mo, 35 Pica Ems wide, 26 long	7	6	5	4½
TWELVES. ———— Miscellany Part, 16 Pica Ems wide, 26 long	7	6	5	4½
TWELVES. Copy, Christian Gentleman's, 26 wide, 35 long	7	6	5	4½
SCHOOL BOOKS.				
TWELVES.—Copy or Crown, not exceeding 17 Pica Ems wide, 31 long, nor less than Brevier	7	6	5	4½
OCTAVO.—Copy or Crown, not exceeding 21 Pica Ems wide, nor less than Long Primer	6	5½	4¾	4¼

N.B.—School Books on Copy or Crown are defined to be Palairet's French Grammar, Chambaud, Salisbury Spelling Book, Fox's Lessons, Ward's Latin Grammar, and all of a similar description.

ALMANACKS.

	d.
Royal Broadsides	7
Demy Ditto, Size Wing or Cambridge	5½
Goldsmith, Calendar Form	5½
Ditto, Prog.	5
Twelves Demy, 19 Ems wide, 34 long, Calendar	5½
Ditto, Prog.	5
Ditto, Crown, Size Rider	5
Octavo Foolscap, 20 Ems wide, 34 long, Cal. and Prog.	5

BILLS IN PARLIAMENT.

	d.
From Nº 4 inclusive, to any Nº under 100	4½
If 100, and under 200	5
If 200 or 250	5½
Above 250 and under 400	4½
If 400 or 500	5
If above 500 and under 700	4½
If 700 or 750	5
All above 750	4½

N. B.—Side Notes to be reckoned in the width; Bottom Notes not to be regarded.

Works on Royal Paper to be paid one halfpenny per hour more than the above Prices.—Ditto on Foolscap or Pot, not less than 1,000 Number, and wrought at one pull, 4½*d.*—Ditto in Square Pages (like Entick's Dictionary) and Works for the Public Offices, to be advanced one halfpenny per hour on the Scale of 1800.—Fine Paper of the same Size, if included within the Token, not to be charged extra; but, if of a larger Size, then to be paid according to the Scale.

Three or more Proofs pulled at one time, to be charged 4*d.* per Forme; and, if made ready, to be charged as a Token.

Cards, large or small, to be paid 6½*d.* per 100.—Jobs without points to be paid 4½*d.* an hour.

Double Crown or Royal Broadsides, not exceeding 100 Number, to be paid 1*s.* 6*d.* if more than 100, to be paid 1*s.* per 100.—Demy Broadsides, not more than 100, to be paid 1*s.*; above 100, and not exceeding 500, to be paid 10*d.* per 100; if above 500, to be paid at the rate of 1*s.* 9*d.* per Token.—Broadsides requiring three pulls to be paid one-third more—No Forme to be deemed a Broadside that comes in at one pull at the Common Press.

Night-work to commence and be paid for, from Ten o'clock till Twelve, 1*s.*; all after to be paid 3*d.* an hour extra till Six.—Morning work, commencing at Four o'clock, to be paid 1*s.* extra.—Sunday work, if not exceeding 6 hours, to be paid for 1*s.* if for a longer time 2*d.* an hour.

It is to be distinctly understood that no Advance shall take place on any Works but those which are paid by the Scale.

Pressmen's Wages.

THE Scale for regulating the price of press-work, appears to have undergone fewer variations than that for case-work, although from the change in the general nature of business, one certainly required at least as much alteration as the other. The proportion of what may be denominated heavy-work, or small type charged to the extent of paper, is now so much above that of light or easy work, that a considerable change might be made in the various definitions with equal justice to the journeyman, master, and employer; and some of the articles are so obviously inconsistent with any regard to fair proportion of charge, that any one would wonder that efforts ever made for the purpose of amendment in this respect, could fail of meeting with success; for instance, look at the article

" Octavos, on Medium or Demy.

Not exceeding 24 Pica Ems, upon Small Pica and upwards	*6d.*	5½*d.*	*5d.*	4½.
If on Long Primer, Bourgeois, or Brevier . . .	*7d.*	5½*d.*	5*d.*	4½.

So that, excepting the number be 250 only, the price is just the same for two articles, admitting of a vast inequality ; example, a sheet of Brevier is not allowed any more for, than a sheet of Pica or English of the same dimensions ! The one may contain (Pica 21 × 43) 28,896 letters in a sheet, the other (Brevier 32½ × 67) 69,680.

As another instance, the article of " School Books, on Copy or Crown," as well as the explanatory note following, had become totally useless long previous to the last two amendments of the Scale, as almost all that class of work has been many years since converted to sizes of twelves, &c. for large paper.

The curious article of a Pot twelves, 35 Pica ems wide, seems to have been a favourite point with the Committee for showing the attachment of the trade to the old scales ; for I have frequently pointed out this, along with other items equally incongruous, but have always been met by reasoning similar to that shown in page 785.

The correctness of the above observations obtains an ample sanction in the fact, that not one half of the work in the trade is paid for by these rules and regulations.

Some rational modification might, perhaps, be devised upon the following plan. I give it merely as a crude idea ; but think the justice of the principle cannot be denied, that a forme of eight pages, of any given size, cannot be worth quite so much for making ready and working, as a forme of twelve pages same size, or, rather the latter must be worth more than the former :

PICA—and larger.

DEMY.	250	600 750	1,000	Above 1,000
	d.	*d.*	*d.*	*d.*
OCTAVO - - up to 18 ms	6	5	4½	4
Above 18 - - 21 -	6¼	5¼	4¾	4¼
Above 21 - - 24 -	6½	5½	5	4½
Above 24	6¾	5¾	5¼	4¾
TWELVES - - up to 16 ms	6½	5½	5	4½
Above 16 - - 21 -	6¾	5¾	5¼	4¾
Above 21	7	6	5½	5
EIGHTEENS - up to 14 ms	7½	6½	6	5¼
Above 14	7¾	6¾	6¼	5½

ADDITIONS TO EACH.

	d.		*d.*
If ROYAL Paper	½	If Brevier	1½
If Small Pica type	¼	Minion	1¾
Long Primer	½	Nonpareil	2
Bourgeois	1	Pearl	3

It would be equally easy to lay down as a rule to guide all parties, that for the second superior class of ink say one fourth, one third, or one half more should be paid and charged; and for the third, or finest sort, one half, two-thirds, or double.

The whole of the complex scale, even if remaining at the present rate, might be comprised, for every useful purpose, in the following seven lines:—

Pages, not exceeding in width, if Folio, 52 Pica ms; Quarto, 40 ms; Octavo, 24 ms; Twelves, 21 ms.

Numbers	250	500 and 750	1,000	All above
Per Token	6*d.*	5½*d.*	5*d.*	4½*d.*

Exceeding the above widths . . . . add ½*d.*
If Eighteens, Twenty-fours, or Thirty-twos . . . . add 1*d.*
If Royal Paper . . . . add ½*d.*

OF THE CHARGE OF THE MASTER PRINTER TO HIS EMPLOYER.

THE foregoing statement of the wages paid by the master to the journeymen for their labour, naturally leads to the consideration of the mode usually adopted by the master of making his charge to the bookseller, author, or other employer, in order to repay his outlay of materials, wages, and other expenses, and obtain a profit for his labour and capital employed. Although I may expect to be able to make myself understood, as far as regards any general rule, to the members of the profession, yet to effect this as any certain guide to others, even in the bulk of a whole volume, would totally fail of being effectual; since it is a rare occurrence for any two works to be of precisely the same value in wages. Mr. Stowers compiled, in 1813, "The Printer's Price Book," in which, with considerable labour and ingenuity, he has given 326 pages of various dimensions, type, pages, &c. &c. and 86 pages of tables of the prices per sheet. Yet I never found a single instance where some variation in width, length, proportion of various type, number, extras, or something or other varying in combination, did not take place to render an entirely new calculation necessary; and, I will venture to assert, that if any master printer in London was to look over his books, he would not find two works in fifty which were so exactly fellows, that they would, in every respect, be of the same expense to him, and, consequently, charge to his employer.

Hitherto, in all treatises on the practice of our Art, this subject seems to have been studiously avoided: in the education also of printers, and in the conducting the business, it has seemed a mystery into which no one was to be initiated till he actually became a master, and then he was to gain his information as well as he could when he had no one to instruct him. The consequences have been such as might have been easily foreseen. The young adventurer has launched into business for himself without any impression being made upon his mind of the vast expenses for outgoings in the concern; his ideas have been dazzled by the *great profit!* which he hears is charged upon the composition and press-work, but which (as will be shown presently) is but a small portion of the master's expenses; he judges that the way to establish a connexion at first setting out, before, perhaps, he has any family to provide for, is by being satisfied with less profit; he offers to work much under the price that the established masters have charged, obtains employ by low estimates, and soon finds himself possessed of less disposable income, than would be obtained by a respectable journeyman.

Now, I see no necessity for all this mystery; and I do hope, that by plainly laying down what my experience has taught me to believe an equitable mode of charging, founded upon the usage of the respectable members of the trade, and giving also some reasons to substantiate it, to promote a certain degree of stability in those who have yet to begin life, and to convince such of our employers as may condescend to give these pages a consideration, that our profits are not such as will bear any diminution, if they wish ample justice to be done to their work, and that we should retain that rank in society which is the surest pledge for a regard to literary and moral character.

The mode of making the charge of Composition and Reading is, first having fixed, by the Scale and Rules hereinbefore given, the proper pay for the composition, to add one fourth of that charge for the reading, and then add to that total one half of its amount to cover the various expenses and yield a profit. The exception to this rule is when the smaller kind of type is used; the Typefounder's charge arising rapidly from four shillings per pound (the price of Brevier) to seven, eight, and fourteen (the prices of Nonpareil, Pearl, and Diamond), the printer increases his addition to the labour-price in nearly the same proportion, to meet the additional expenditure of materials.

The next article of a Compositor's charge is Corrections; which, as I have before observed [see p. 745] is the most onerous part of the business to both journeyman, master, and employer. The former, who are paid by the hour, about the same as for per thousand composing, find that it throws them out of the regular quick habit of composing, and deadens the nice sensibility of feel of the tips of the fingers, so essential to the Compositors' business—the master, from the delay it occasions in the process of a work, the des[illegible]ion of his type and materials by the use of the bodkin, the proof-paper used, Reader's time occupied, and boys to carry proofs out, and fetch them back again. This work is always valued, and I think very inadequately, by doubling, without any charge for reading, the Compositor's charge, and therefore amounts to one shilling per hour, per man, for whatever time the proofs may take: extra for occasional table matter, small type more than may be paid for in the notes, peculiar characters, Greek, Hebrew, &c. is valued by the same rule.

In calculations of Table Work all the brass rule, actually cut up for the work, is charged at prime cost, the cuttings and old brass going for the profit. So of any peculiar sorts cut or cast purposely for a work, if not likely to be again useful as the necessary stock of a printing-office: of course, in a second edition of the same work, this extra expense does not recur. Postage and coach charges are just re-charged what they cost.

Out of these charges, in addition to the actual cost of workmanship, is to be paid the great expense of fitting up a printing-office in the first instance: then the vast expense of type, with its certain and speedy deterioration till condemned to the metal-pot; then furniture, another perishable article; proof paper; fire and light; rent, taxes, and repairs; capital sunk, or paid for in the shape of interest, to give the accustomed trade-credit; all of which amount to so considerable a sum in the aggregate, that I very much doubt, were it possible to analyse the value of material employed and expenses attendant upon each individual work and job, whether any profit whatever, above common interest for the capital employed would accrue upon this branch of his business upon the great majority of works passing through the house of a London printer; but it has been handed down to us from ancient times as the established criterion of our charge for Case-work.

It may have been possible, in the early ages of typography, to have made a nearer approximation towards a fair quota of expense attendant upon each separate work; the type was of a fashion, and the metal of a quality, formed for much longer endurance than what we get in this age; the eye of the Bookseller and Reader were satisfied if they got a clear legible impression of good old English characters, and a fount of letter arrived to a fair old age before any objection was made to its use for repeated editions of the same work; till, in some old established printing offices, the type was of an age "time out of mind" of either master or man. I need not add, how different, in every respect, is the case now; few works are expected to be re-printed in the type which was employed on the previous edition, and a comparison of the prices of type for the same periods as has been given in the Table of comparative price of Compositor's wages, by which the master's price was equally regulated, will show that his recompence for that great outgoing of his concern, has by no means kept pace with his outlay, the former showing an advance of about 50 per cent, the following very little short of 100 per cent:—

	Thus, from 1763 to 1792. s.	d.	Same Founts in 1816—1822. s.	d.
Pica	1	0 per lb.	2	6 per lb.
Small Pica	1	2	2	8
Long Primer	1	6	3	0
Bourgeois	2	0	3	8
Brevier	2	6	4	0
	5) 8	2	5) 15	10
Average	1	7½	3	2

Thus, the amount of wages paid, forming the ground-work of the charges made, seems to be the fairest mode which can be adopted, because any advance in the former would proportionably elevate the latter; but if that was right in former days, to cover the expense of what may be called the raw material, it must be a much worse trade now, when the material has borne an advance of 100 per cent, and wages and charges only 50—add to which (and it is no slight consideration) that from the increased price of paper, the more expensive type of Long Primer, Bourgeois, and Brevier is called for in a three-fold proportion.

For press-work, a greater proportion is laid upon the sum paid to the workmen for expenses and profit, in order to compensate, not only for his wages, the expense of wear and tear of presses, parchments, blankets, oil, proof-paper, balls, rollers, and the endless variety of utensils called for in mechanical operations, but the INK also. This was formerly calculated by taking the exact sum paid for the working of the first 1,000 into the same calculation as the composition and reading, and then adding (as it was called) the thirds* upon the whole; about 1810, it was, from the vast increase of expenses, judged necessary to abandon this mode, and charge the whole impression as ream-work, by the scale following; viz.

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* I have heard that some have agreed to revert to the old mode; but I am convinced, from the most minute calculation, by weighing the ink used for reams of various works, the value of the rental on the cost, with wear and repairs of the machine, the expenses of balls or rollers, oil, parchments, blankets, set-off paper, wetting and drying, warehouse-work, &c. &c. &c.; that adding "the thirds" to the first 1,000, does not pay expenses, much less yield profit to live by.

Pressman's Charge per Hour, or Token, or Half Ream perfect,			The Charge to Employer.	
being 4½*d.*	or per Ream 3*s.*	0*d.*	is per Ream 7*s.*	0*d.*
5	3	4	8	0
5½	3	8	9	0
6	4	0	10	0
6½	4	4	11	0
7	4	8	12	0
7½	5	0	13	0
8	5	4	14	0
8½	5	8	15	0
9	6	0	16	0

Thus increasing the charge to the employer for every ½*d.* per token paid the journeymen, 1*s.* per ream; which, as the greater the wages paid, so much more, either in quantity or value, will be the ink used, the time of the press occupied, proof-paper destroyed, &c. appears as rational a mode as could be devised.

For works of a superb description, it is necessary to pay a vast increase upon the above scale; 1*s.*, 1*s* 3*d.*, 1*s.* 6*d.* per token are frequently paid for working with the finest descriptions of ink, greatest care, interleaving every sheet with common paper, and other niceties; the finest works are done on establishment, per week, and limited to doing only so much per day; thus, those grand works of British typography, Bowyer's England, and Macklin's Bible were limited to about three tokens per day, and three or more hours were expended in making ready a single forme.

In this branch of his business, as well as the former, the master printer is paid much less, by comparison with former times, for his work in proportion to his increased expenses. Blackwell's ink, at the period before alluded to, was 1*s.* 3*d.* per lb., now we can use nothing for good book-work under 2*s.* 6*d.*

The best presses were made by Arding for eighteen or twenty pounds each, now we are thought unfit for good work with presses that cost less than from seventy to eighty guineas. Then pressmen could be trusted to do their work properly with only the general superintendence of the master or overseer; now we must keep a foreman at high wages to attend to the press-room only. Then we had long numbers and easy work to keep a press going for days together; now all our long numbers go to cormorant machines.

The following calculation of a printer's profits was given by an eminent printer to the Select Committee of the House of Commons on Printing and Stationary—*See* Report, 30th July, 1822—Appendix B.

"ESTIMATE PROFIT and Loss on Printing 500 Copies of an Octavo Volume.

Total charge for printing 500 copies of an Octavo Volume, consisting of 26 sheets (or 416 pages) at 39*s*. per sheet			£50 14 0
CALCULATE—Case-work	0 16 0	1 0 0	
Reading	0 4 0		
Add Profit and Loss		0 10 0	
			1 10 0
Press-work, 1 Ream			0 9 0
Per Sheet			£1 19 0

ANALYSIS—Paid Compositors . . 0 16 0 } 1 0 0
Reading and Overseers 0 4 0 }
Add 50 per cent . . 0 10 0 to cover cost and wear and tear of TYPES, and other materials used for the work; rent, taxes, and other incidental expenses, interest and capital employed, and profit.

Charged for one ream Press-work, 9*s*.; viz.
Paid 2 Pressmen, 4 hours each, at 5½*d*. . 0 3 8
Warehouse-work* 0 0 11
0 4 7
Add difference . . . . 0 4 5 To cover cost of INK, wear and tear of presses, rent, taxes, &c. as above.

Charge for Profit and Loss:—At Case . . . 0 10 0
Press . . . 0 4 5

0 14 5 per sheet, which, on 26 sheets, amounts to £18 14 10. Of this sum not more than one third can be reckoned as actual profit, which is £6 5. on the 500 volumes (= 3*d*. each), and gives about 12 per cent on the total charge.

J. L. C."

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* Taking-in and stowing the paper, wetting down the paper; hanging-up after printed off, for drying; taking-down, smoothing, and pressing; laying on the gathering-boards; gathering, collating, and putting into portions for delivery to the bookseller or binder, &c. L. H.

It was formerly understood, as a general principle, that Parliamentary Work was charged at a much higher rate for Profit and Expenses than bookseller's work, at least *double*, sometimes more; and with very great reason. No one can know, who has not been initiated into all the peculiarities attending parliamentary business, the great expenses incurred by the much larger stock of materials necessary for carrying it on, above the ordinary routine of book-work;* the hurry and expedition always required; the personal attendance of the principal; the incessant care upon his mind of satisfying the various official and subordinate hands through which his work must pass; the expenses of keeping workmen constantly upon the alert; great part of their time lost by waiting from the finishing of one job to the beginning of another; such business allowing of no stock work to which the men can resort; the ruin it inflicts upon private work, which cannot be kept as mere stop-gap for parliamentary work; the great attention and skill required to arrange the various kinds of manuscripts and table-work, previous to putting into the compositor's hands:—no one else can know the sacrifice which must be made of all the comforts and enjoyments of life of a Parliamentary Printer; and if no greater return for the immense stock of materials required, skill exerted, and attention necessary, can be obtained for that description of business, than for what is denominated Book-work, Parliamentary business should never have my labour while the printing of books, pamphlets, or newspapers could be procured to keep a moderate establishment in employ.

But so it is said to be now. The Evidence given in that Report states, that great reductions have been made in the rate of profit since 1810, and that the mode of charging is now precisely in the same ratio as that done for booksellers. Numerous calculations are given to expose the whole arcana of typographic charges by those who are (and some who fain would be) parliamentary printers.

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* Instances are stated in the Report above referred to, of upwards of three hundred sheets being left standing and unworked, in one parliamentary office, at the end of a session. Also, of one Report which had 20,000 lbs. of type laid fast at one time; and a calculation of the total amount of type required in that office, appropriate to parliamentary works, to the enormous extent of two hundred and twenty-five thousand pounds weight!

The Journals, being done upon a different principle, are only paid to the men as booksellers' work.

There is one remaining branch of a printing establishment to mention, of considerable importance to the employer, and no trifling expense to the printer; namely, THE WAREHOUSE, but which, as no specific item is put down in estimating the charges, would have no further mention in this chapter, except for showing that its expenses are to be paid out of the reading charge, or ream-work profit. The only seeming exception to this is, where, in some extensive establishments, the printer *cold-presses* or *glaze-presses* such work as may be so ordered; but as this must occasion a fresh expense, and an addition of hands, it can be no absolute exception to the general rule.

Hot-pressing is usually executed by those who make it a profession for pressing cloths, as well as paper (with the exception of, I believe, one person who presses for printers and booksellers only). It is a process which costs some expense in the outfit, requiring very strong, powerful presses; glazed boards to be placed alternately with every sheet of the paper; furnace and oven to heat the iron plates, one of which is laid between each twenty or thirty sheets, till the press is full, and the whole is pressed down by a lever and windlass, or by Bramah's hydraulic machinery. This gives a smooth glossy face to the paper and print, but is far from beneficial to either; the paper will yield, by the heat of the plates, something of its white bleached colour, and turn brown or yellow; and the ink, unless of the finest quality, and well set by a length of time after printing, will run or spread on the surface of the paper, and very frequently, if the oil or varnish has not been well prepared, show a dark brown oily appearance, or shade, round the thick parts of the letter. It is, therefore, now the custom, to obviate such inconveniences, particularly since length of time is now neither the plan nor interest of printer or bookseller, to *cold-press* all fine work; that is, to effect the whole process by greater power, and the use of glazed boards only, abandoning the hot plates: consequently it is now more in the power of the printer's establishment to manage, than when the furnace, oven, and hot iron plates were necessary; for, by the addition of the glazed boards, to a powerful iron-screw standing press, and lengthened lever, or still greater power of an hydraulic press, he may manage to make the process pass tolerably well without sending his work to the hot-pressers, who never take such care to keep work free from soil as a printer's establishment. The very circumstance of passing through more hands, with carriage to and fro, must make it more liable to these accidents; but, as hinted above, it is not done without expense; the glazed boards are costly, 37*s*. to 40*s*. per gross; the time of boy and man to superintend mounts high, and the only effectual means of executing it, by an hydraulic press of from £100 to £150* value, increases the outlay; but with such a press the process becomes effectual, simple, and easy; and three or four hours will be sufficient for the work to remain under such pressure.

The charge for hot-pressing is from 2*s*. 6*d*. to 3*s*. per ream, but the cold-pressing may be very fairly paid at 2*s*. per ream.

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* An hydraulic press is valued by the calculation of the number of tons pressure for which it is constructed; thus, 60 tons, £60; 150 tons, £150. See more upon the hydraulic press in page 224.

OF THE ROLLER-PRESS, OR COPPER-PLATE PRINTING.

CHAPTER XIV.

On the Rolling Press, or Copper-plate Printing—Description of the Press—Mode of Inking and Pressure—Charcoal Vapour exchanged for Heat of Steam—Further exemplification of the difference of Type and Plate Impression.

ALTHOUGH the printing from engraved plates cannot, strictly speaking, claim to be treated of in a work professedly on typography, yet are the two species of printing so closely allied, that, in many respectable provincial offices they are carried on under the same roof; and consequently some mention of this branch of printing may be deemed necessary to render this work complete.

Copper-plate printing is done by a machine called the rolling-press, which may be considered as consisting of two parts; namely, the body and the carriage: analogous, in some respects, to the letter-press. The body consists of two cheeks of which the dimensions are not always the same; but, ordinarily, about four feet and a half high; a foot thick; and including a space of two and a half feet between them. These cheeks are fixed by tenons into wooden feet, which rest horizontally upon the floor, and to which they are made to stand perpendicular, being joined at the top by a cross-piece, or head. From the feet towards each end, rise also four other perpendicular pieces each about three feet high, which, with other horizontal pieces, form a frame-work both before and behind the cheeks, serving to sustain a smooth even plank about four feet and a half long, two feet and a half broad, and an inch and a half thick, upon which the engraven plate is to be placed for printing, and which may altogether be considered as the carriage of the press. Between the cheeks work two wooden cylinders or rollers, commonly of about six inches diameter, each of which has its ends lessened to about two inches diameter, called trunnions, by which each is borne in two pieces of wood in form of half-moons, and lined with polished iron to facilitate the motion, and which are made to play in grooves formed lengthways in the cheeks. The space in the half-moons left vacant by the trunnion is filled with paper, pasteboard, &c. so that they may be raised and lowered at discretion, to leave the necessary space between them for the passage of the plank charged with the plate, paper, and blankets. Lastly, to one of the trunnions of the upper roller is fastened a cross, consisting of two levers or bars of wood traversing each other. The arms of this cross serve in lieu of the handle of the common press, by the aid of which the workman gives a motion to the upper roller, by which a motion being also communicated to the under one, the plank is forced backwards and forwards between them, with the plate and paper, and hence impressions are obtained.

The following is a brief description of the mode of printing from copper-plates. The workman takes a small quantity of the ink upon a rubber made of linen rags strongly bound about each other, and with this smears the whole face of the plate as it lies on a grate over a charcoal fire.* The plate being sufficiently

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* This is a part of the process which renders the business extremely injurious to the health of the workmen, in consequence of the noxious vapour arising from the charcoal, as each man in the shop must work over a fire of this kind. To obviate this distressing evil, the application of steam for the purpose of heating plates has been successfully applied by Mr. Ramshaw, an eminent copper-plate printer of Fetter-lane. The Society for the Encouragement of Arts, in the session 1818, rewarded his invention by a gold medal, showing a laudable disposition to liberally confer their honours and rewards on such as should introduce means of preventing the worst of human calamities to a laborious mechanic—the loss of health. The following communication was received from him on the subject, and drawings of his invention are preserved in the Society's repository.

33, Fetter Lane, Fleet Street, March 10, 1818.

Sir;—I beg leave, through your hands, to present for the approbation of the Society of Arts, &c. a representation of my apparatus for an improved plan of copper-plate printing, by the use of steam in the place of charcoal fires, the effluvia of which are so injurious to the health of the workmen, and at the same time subject to many accidents by fire; as by the old process, each man works over a charcoal fire, without any chimney to carry off the vapour inked, he first wipes it over with a foul rag to take off the extra colour; then with the palm of his left-hand, and then with that of his right, he continues to free the surface of the plate from all the unnecessary ink which it had received; and to forward this operation of wiping, he drys the inside of his hands from time to time by rubbing them on a lump of whitening. In wiping the plate perfectly clean, without taking too much ink out of the strokes cut by the graver, consists the practical proficiency of the workman in his art.

The plate, thus prepared, is next laid on the plank of the press, and upon it is placed the paper, well moistened after the manner described in the letter-press process, in order that it may the more freely receive the ink and impression. Two or three folds of

arising from the burning charcoal. Thirteen of those fires I formerly had in my work-shops, and one sea-coal fire or stove in my drying-room, fourteen fires in the whole: by my new process, the use of the thirteen charcoal fires is superseded. The apparatus consists of the fire-place; a small boiler, containing only thirty gallons of water, with two safety-valves; the pipes for conveying the steam to the plate boxes of cast-iron, thirteen in number, supplying the place of thirteen charcoal fires; they have a flat surface, 16 inches square, half an inch deep at the sides, running to three inches in the centre, thus leaving a fall for the water to run as the steam condenses; these boxes are particularly convenient for the workmen, as they turn out their work much cleaner than by the usual process, not having to attend to their charcoal fires. Another advantage is, that injury to the health of those employed is thus prevented, as every person must be convinced of the unhealthy state of rooms where charcoal is burning in open pots, without flues, from which both noxious fumes and particles of fine dust are continually escaping.

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Another use to which the stove is put, is that of throwing hot dry air into the drying-room, and extracting the damp air. The apparatus which performs this latter office, acts on the principle of the reversed syphon; having an open aperture in the side of the stove, which admits the external air into a cast-iron box, which surrounds the upper part of the fire: here the air being heated, passes into the drying-room through a tube. When cooled and saturated with moisture from the wet paper in the rack, it falls through the tube into the boxes which surround the lower part of the fire, and being thus again heated, rises up the tube into the drying-room

* * * * * * * *

I am, Sir,
Yours, &c.
JAMES RAMSHAW.

A. Aikin, Esq.
Secretary, &c.

flannel are then brought over the plate, and things thus disposed, the press is set in motion by pulling the arms of the cross, by which means the plank bearing the plate and paper is carried through between the rollers, which, pinching very forcibly and equally, press the moistened and yielding paper into the strokes of the engraving, whence it draws out a sufficient portion of the ink to display every line of the intended print.

This description will again explain, but in more technical detail, what has been so frequently mentioned in the foregoing parts of this work; namely, the essential difference between the processes of type and plate printing. In those former explanations of the distinction between the two arts, the peculiar principle which distinguished each was briefly pointed out; and from what is here said, it will be further apparent, that by the soft substance of the cloth or blankets the moistened paper is forced, by the pressure of the rollers, into the engraved lines of the plate, in which only the ink is deposited, and from which it is drawn out upon the surface of the paper; so that, what is called the impression, is, according to the strict fact, the very reverse of an impression in its technical sense: for the lines, and other parts of the engraving which form the picture or words, will appear *in relief* upon the paper, in proportion to the depth to which the engraving tool has gone into the copper; and the body of ink, adhering also to the paper upon the projecting parts of its surface, will make this fact perfectly perceptible both to the eye and touch, particularly in all the stronger lines of an engraving.

CONSTRUCTION OF AN OFFICE.

CHAPTER XV.

Construction of a Printing Office—Space required—Health of Workmen; Safety from Fire; Security of the Work, gained by a new mode of Drying the Sheets—Effectual mode of Warming and Ventilating an Office; Description of Apparatus—Best method of Lighting.

TO lay down any general system for erecting buildings for this purpose would be, in many instances, wholly useless; so much must depend on the relative circumstances of ground-plot, adjacent buildings affecting the light, height allowed, amount of business to be provided for, and various other considerations, that I feel some difficulty in the attempt. But if the supposition be allowed, that in the particulars of ground, light, capital to be expended, &c. there be ample latitude of speculation, it is very possible to lay down the general principles of a good and eligible plan, or at least such hints towards the formation of one, as may answer every necessary purpose. In the first place, I should think it an arrangement highly desirable, that the warehouse, or paper department, should be completely separated from the printing, or operative divisions of the business, as affording a great security, in addition to those that will be hereafter suggested, from the fatal effects of conflagration; this department might very conveniently form a detached wing of the building; and as a foundry for stereotype, oven, &c. for hot-pressing, and machinery in lieu of presswork, are becoming general appendages to a printing establishment of any magnitude, these might very well form the ground-floor of the other wing; the picking-room, lathe-room, &c. the upper floor; over each of these wings rooms for drying, on the plan of, and in addition to, what I shall presently describe. The centre building would comprise, on the basement, dry store-rooms for type, standing formes, safe-room for stereotype plates, wetting-room, and other necessary purposes: the ground-floor should contain the press-room, for let the success of machine-printing be ever so great, some presses must be retained; over this two or three floors of composing-rooms, reading-closets, manager's room, &c. &c.—the attic a drying-room.

However, as we must consider that printing establishments of any consequence are generally erected in cities and towns where land is too valuable to allow an unnecessarily extended ground-plot, adequate to such a spread of building, I shall now treat the subject as supposing nothing more than one on which an office must be erected as compactly as possible. I had to consider this matter a short time since, upon an opinion being asked as to the best plan for a printing-office about to be erected at the University of Cambridge; and, in concert with the best practical builder and fitter-up of printing-offices in this kingdom, Mr. Arding, formed a plan upon the principles which I have been laying down.

A parallelogram is decidedly the best form for a building for this specific purpose, and a width of twenty-five feet fully sufficient; as more would deprive the centre of the room of the advantage of light from either side. A common press with its bank takes up about eight feet; then say three feet clear passage way; in the centre a range of bulks for wrought-off paper, under which standings and racks for formes, say two feet more. This provides for a range of presses on each side: and in length of room 7 feet 6 inches to 8 feet may be calculated for each press, taking care that the posts or piers between the windows are arranged so that an uninterrupted light is secured to each press. For the composing-rooms the same width will allow a range of frames on each side, a clear passage, and a double row of imposing and correcting stones down the centre. The joists of all the floors should have short bearings, the floor boards to be grooved and tongued, and the ceilings, for many reasons, must be lath and plaster; any thing more than finishing the walls fair, and lime-washing, is quite unnecessary.

In building, or more strictly speaking, altering my present office, I have tried the experiment of a plan which I had long contemplated, of avoiding the drying of the worked-off paper over the heads of either compositors or pressmen: first, from a consideration for the health of those employed; secondly, with a view to the danger from the easy communication of fire from their candles, or any other light, to the sheets on the poles, when, from being dry, and the edges curling, the flames would rapidly spread; thirdly, the dust arising from the various movements about an office; and last, but not least, the safety of the sheets from being either taken off the poles by sudden draughts of air, and becoming soiled in the fall or handling, or for purposes of curiosity or fraud. As to the health of the workmen, it is very true that habit conquers many causes of ill-health to the human frame: the boys of a great public school are brought up to carry the covering for their heads constantly in their hands, and go bare-headed in all weathers, since they would not be reckoned *true blues* if that piece of apparel was ever seen in its proper place: still I hold the opinion that the suspension of wet paper immediately over the bare heads of working people, and the evaporation consequent upon the drying pervading the whole atmosphere of the room, must be highly detrimental to their healths. This was my strong and concluding reason, in addition to that of the danger from fire: but with respect to the latter, I have been often astonished, that any printing-office, as they are usually constructed out of old houses, low rooms, dry wainscots, and rotten floors, ever stood a candle-light season. I determined to try a mode for obviating altogether these inconveniences and dangers: first, by abandoning the plan of *poling* the working-rooms, I was enabled to keep my ceilings eighteen inches or two feet lower, this in two floors gained me above three feet, and then taking the rake of the rafters of the roof, I gained an upper room without going a foot higher in the building; the difficulty was, how, in any one such room, to make an arrangement for hanging as many sheets as the floors below would have contained in the usual manner; this, however, was obviated by the contrivance of tiers of poles suspended in rows within a foot of the floor, six inches apart, by means of cords passing through each end, and kept fourteen inches apart by hollow turned truncheons, suspended by a ring to an iron rod attached to the ceiling. By sliding on the rods the poles can be packed together; the boy then detaches one section of poles to a short distance, or its proper place, and with a short peel hangs the sheets in the usual way; then a second section, and so on till all are full. The quantity which a small room will contain upon this plan is really surprising. I have in one apartment, which in fact would otherwise have been useless, or a mere cock-loft, above three thousand feet of poling, perfectly secure from every contingency before mentioned ; for, by having the doors or flaps cased with plate iron, and not allowing any light to be carried there, or any person to enter but the hanger-up, I have absolute security in every respect in this department. The mode of conducting heat to dry the sheets will be by-and-by described. The warehouse I have on the ground-floor, and this being sufficiently lofty, I allow common poling there, because (particularly as my lights are all fixed) not attended with any of the dangers before-mentioned as forming the defects of the old system, as well as to allow of occasionally hang-up works, wrought off too late in the day to allow of being carried up to the regular drying-room.

There are two departments of the economy of a printing-office which would appear to be thought of the very *least* importance, as if they were absolute nuisances, and as such shifted off to any holes and corners of the building, unfit for any other purpose, where they, consequently, must be hid from the general superintendence of the master and manager. Now, I esteem these departments of the *first* consequence; every thing perfect in composition, and good in press-work, depends upon them; the eye and attention of the master ought to be continually glancing at them, without being obliged, at the same time, to be under the observation of the workmen. Now of these two departments,

First—The Reading-Rooms.

These are usually screwed up in an attic, or some corner or closet not applicable to any other purpose ; and if more than one are employed, often as far off from each other as the building will admit: now, I advise and practise a totally different plan: let the reading department be all together, separate closets, but all enclosed by one general door; place it as near as possible to the master's or manager's room: it is with that part of his business he must have the most frequent communication, as the progress of the reading must indicate the progress of every other part of the office; and frequent occasion must occur in which inquiry as to the state of the proofs will be the readiest answer to his employers. It keeps the readers apart and independent of the compositors, for although harmony between all employed is truly desirable, yet I never wish to see readers and compositors too intimate.

Secondly—The Wetting-Room,

Is the other department to which I allude. Here it is that the first process of the actual printing commences, and the press-men are to begin their work upon a substance, the chief recommendation of which is, its delicacy of colour; yet, by some perversion of judgment, in nearly every printing-office which has come under my inspection, it has appeared as if the place for this process was sought for out of the very refuse part of the whole premises, where neither light nor air were thought of any consequence, provided water were obtained; and it also generally happens that such a situation is alike exposed to every filthy purpose that may be the consequence of many men and boys working under the same roof: here it is, that waste and pillage of our employers' property, if unfortunately a dishonest man or boy should be in the house, is effected, either for the purpose of making away with the paper, for sale, as it comes from the warehouse-man's hands, or abstracting from one heap to supply the waste and spoil of another, or working surreptitious copies. To avoid all this, I would choose a room in the most central, safe, clean, and convenient part of the house, between the warehouse and press-room, where good light, free ventilation, and an ample supply of water, are to be obtained; to this room I would allow access to none but the wetter, and the foreman of the press-room; no pressman should have any paper out of it but by his direction, and, generally, in his presence. No washing of hands, or other process which can leave dirt or grease behind, should ever be effected in this room; ample cisterns and troughs of water, never used for any other purpose, should be provided: of course, great precautions must be used to prevent the effects of any accident or overflow; the room must be floored and lined breast high all round with lead, so that no splashing, or dripping from the sinks, troughs, or wet heaps, can ever get to the wood-work; proper water-channels and outlets must be provided, and the lead floor covered by an open platform of wood-work, consisting of planks joined in such a manner as to admit of their being conveniently removed for the purpose of cleansing; proper stages for the paper should be fitted to the sides of the room.

OF APPLYING HEAT AND VENTILATION TO A PRINTING-OFFICE.

A METHOD by which to warm a building to effect the objects of drying the paper and rendering the workmen comfortable, with, at the same time, a due regard to the great objects of safety, economy, and health, will be acknowledged an important consideration. For any success which I may have had in this pursuit, I am indebted to Mr. Jacob Perkins, who, on his first arrival in this country from America, in order to introduce his system of security from forgery of the circulating paper medium, brought this mode of increasing heat and ventilation forward among the first of many other valuable applications of mechanic science, by which this country has been benefited by his emigration. This mode of imparting heat is more particularly applicable and valuable to any erection or large building, not divided into suites of small rooms. I first tried the experiment in a building consisting of four floors, all, with the exception of two small reading-closets, open rooms, above fifty feet long. The apparatus consists of one cast-iron cylinder, about 16 inches diameter, by 21 high, having a grating at bottom, and an opening at top: very near the bottom is the entrance to the smoke, or heated gas, flue, turning up, as an elbow, eight or ten inches from the body, being cast in one mould; about six inches upwards, this is joined by a pipe, about eight inches diameter, of wrought plate-iron, which is continued to the air or chimney into which it may be conducted. At about the distance of twelve inches from the top of the cylinder commences, with a larger mouth, or inverted funnel, a tube to surround the other, of eighteen inches diameter, which is continued to the upper floor, having openings in each story for the emission of the warm air, regulated by sliders or valves. At the back of the cylinder there must be a strong air draught, either by an opening and pipe, 14 inches diameter, communicating through the wall with the open air, or led through some other part of the building by an air-trunk, or some other suitable contrivance, according to the circumstances of the building. The cylinder is now to be charged for the fire, from the opening at the top; first, with the coal and coke, next the wood, next the paper and shavings, and then the light; and the whole will become very soon ignited. In this apparatus the air to supply the combustion entering at the top, and drawing through every orifice of the contents, the smoke will be immediately consumed, or form hot gas, which will ascend the inner flue, the tube surrounding which being filled with fresh air from the opening or induction before mentioned at the back of the cylinder; which, by circulating round the inner, or heated tube, will become slightly rarified, rush rapidly upwards, and by the openings before mentioned distribute to each room a genial warmth. Perhaps, by this description, the mode of operation will be nearly understood; but as it is a matter of some importance, I shall elucidate it by an engraving, showing a section of the stove, and portion of the pipes. *a* is the top of the cylinder, at which the fuel is supplied; *b* the cover; *c* the grating at bottom, attached by a hinge at the back *d*, and held in its place by an iron button *e*; *f* the stand for the cylinder, forming the ash pit, having a cover; *g g* the inner flue, or smoke pipe; *k k* the outer, or air pipe; *h* air pipes for admission of fresh air from the outside of the building, directed by the iron screen *i i* to impinge on the flue and stove. The minor arrangements, and the valves and openings into the rooms must be regulated according to circumstances. The cylinder must, of course, have a

Fig. 1

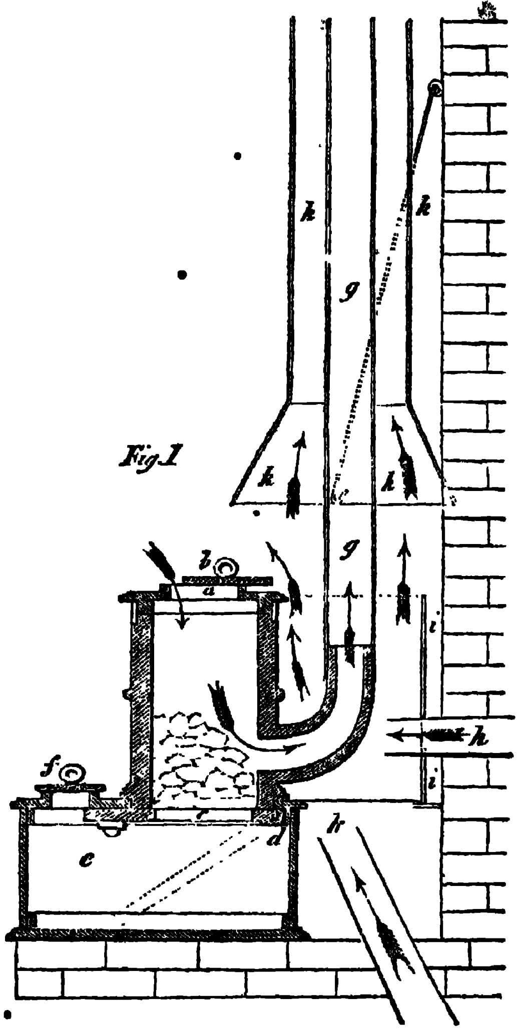
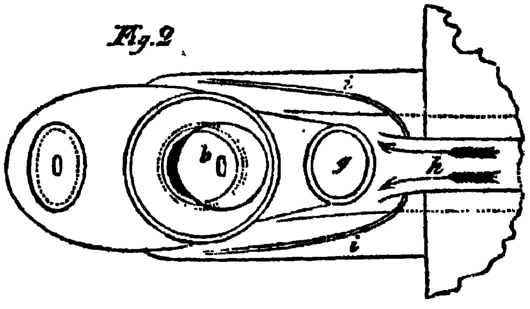


Fig. 2



stand, and a reservoir or ash pit below it, to be cleared out occasionally; this, when the fire is first lit, must be, for a short time, opened, by moving the cover, and the top of the cylinder closed; at this time the fire is acting as a common furnace, sending smoke, unconverted into gas, up the flue or chimney; but when fairly lit, this lower opening must be closed, and the top of the cylinder opened; when the complete supply of heat commences, by the consumption of the smoke, and converting it into heated gas. The floor in which the apparatus is standing (fixing is not required) obtains a share of heat, by part of the air impinging against the cylinder and elbow becoming warmed, and forced to the further parts of the room.

The heat, which I have before called genial, affords so very different a sensation from that usually obtained by means of closed fire places, furnaces, or stoves, as to strike with surprise and pleasure every one who experiences its effects; so far from having any effect prejudicial to health, the sensation is that of comfort and a freer play of the lungs; every inconvenience of having open fire places in every room of a printing-office (and many there are even above those felt in other situations) is thus avoided, and absolute safety, from either accident or loss of time, acquired at a small expense. If the dryest sheets of paper were to fall from the poles of a printing-office, instead of being drawn towards the fire, they would be repelled, and no heat, to which it is possible to bring the outer tube, can ignite the most combustible substance, while it is easy to throw into any floor, almost any degree of heat in which workmen ought to pursue their labour.

I should have remarked, perhaps, before this time, that the apparatus here described is only calculated for a perpendicular position of the tubes or pipes. I have two horizontal branches for detached rooms, but find it difficult to direct a current of the warm air from the main tube in those directions.

As to the situation in the premises, in both cases where I have tried the plan, I have taken positions, where, by cutting through the trimmers of the fire hearths of the upper floors, I could pass the tubes with the least possible inconvenience or interruption either to light or room; always, as a preliminary movement, bricking up, or arching over, all the fire places. However, were the apparatus to be fixed at one end of a very long and narrow building, say fifty feet or upwards, I would reserve a small fire-place at the other; as, in very cold weather, and but little air stirring, such a contrivance, with a very small fire indeed, would induce an action of the apparatus and produce a draught to the warm air, which could not otherwise be obtained. As to the fuel most advantageous to the purpose, I find a mixture of coke and very small coal, answer best, but the stove will burn any kind of fuel. The draught is regulated by the cover at the top of the cylinder, which, when closed, keeps the fire in almost a quiescent state; when opened, the air rushes downwards, through the fuel, with a roaring noise. No cleansing of the flue has been found necessary in mine: the chimney, into which it is turned, requires the usual attention. One other little addition ought not to be omitted; the introduction of so much warmed air produces sometimes a sensation of an over-dried atmosphere; this is remedied by having a vessel, containing water, on the top of the cylinder; a gentle evaporation arises from this, which moistens and softens the air and renders it perfectly pleasant and agreeable.

The consumption of fuel to effect all these purposes of warming and drying a whole building is comparatively trifling: such as I have been describing consumes about the quantity of two fire-grates; I must have had ten or twelve constantly burning in the old way: the saving in the time of boys lighting fires, clearing cinders, supplying coals, &c. &c. is pretty considerable; soon defraying the original cost of the apparatus, which, now that experiment and use have made the workmanship plain and easy, will not exceeed £40 or £50 for a large building, exclusive of any horizontal branches, which, as I have said, are not to be recommended.

The Society of Arts gave Mr. Perkins their large silver medal for his communication upon this mode of heat and ventilation. The first paper upon which will be found in vol. 38, p. 80, plate 7; and a subsequent paper, with some improvements, in vol. 39, p. 138, plate 7: the drawing in the last reference was made from the apparatus in my office.

For lighting a printing-office there are but two ways at the option of every situation; namely, tallow and oil; the last I think the worst. Where the situation admits of the application of gas, that is superior to any other in light, safety, and economy. Burners must of course be fixed wherever a light is likely to be wanted. I use the *burner* reversed, with only one flame, from a hole in the side; this gives a long flame, taking a serpentine form, in a horizontal direction, and prevents any tricks being played by the enlargement of the holes with the compositor's bodkin. In some particular situations I allow two jets of flame. To each Press a double flame on the off side, and one extra suspended from the ceiling, or attached to the columns or walls, to every two presses, in a line with the extremity of the banks. The Compositors have one single flame to each frame, and a double one over each stone. All these must have horizontal swing joints to turn from the Roman to the Italic; and for the pressmen, to suit the various positions for laying the sheet on the tympans, the pointing, &c. The Readers are allowed each a small Argand and glass. The supply of gas, to give mutual satisfaction to manufacturer and consumer, must be regulated and charged by a gas-meter; the present price is 15*s.* per 1,000 cubic feet. This mode of light I consider as being perfectly safe: each flame has a fixed position, or only allowing an horizontal range of its lower joint; a stop-cock in the main service to each floor, and one master-cock at the entrance, serves as perfect security from any waste of gas. A secure lanthorn is the only portable light which should be allowed.

STEREOTYPE PRINTING.

CHAPTER XVI.

SECTION I.

General Description of the Process—Origin of the Principle—Modern application—Van der Mey's process of forming Type into solid blocks, not Plates—Mr. Tilloch's Statement—Mr. Nichols's account of Ged's Stereotype—Mr. Tilloch's invention of a similar process fifty years afterwards—Didot—Lord Stanhope and Mr. Wilson.

THIS method of printing, or rather auxilium of the art, though not by any means a late invention, was revived and brought into modern practice by that scientific and public-spirited nobleman, Earl Stanhope, whose hitherto unpublished manuscript on the subject will be introduced in a description of the process given in the subsequent pages. As the subject upon which I am entering has, of late years, given rise to considerable discussion, and as it truly is, in many respects, of the utmost importance to printers and booksellers, it would not be proper to pass it lightly over.

The mode of operation may be shortly described thus :—The pages must be set up in the usual way with fusil types of the common make, but cast higher shanked, and supplied with spaces, quadrats, &c. of a peculiar height, as will be hereafter described. The pages are imposed, one, two, or more together, according to their size, in a small chase. From this forme a mould is taken, *en creux*,* in calcined gypsum, or plaster of Paris; and from this

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* "A punch *in relievo* forms a matrix *en creux*, and this matrix produces a type *in relievo:* such are the common types. If the punch be *en creux*, the matrix will be *in relievo*, and the type *en creux;* and the effect of this type will be the reverse of the effect of the former."—Mores, p. 67, *n*. Stereotyping, then, is the application of this principle to a body or forme of types.

Many attempts have been made at another species of transfer, upon similar mould a cast of metal, having the face of whatsoever types it contains, *in relief*, in one plane surface, forming a plate of metal about a Pica or Small Pica in thickness.

This part of my work will be divided into five sections, in the first of which I shall treat of the origin of the invention—in the second, of its utility—in the third, of the mode of practice—in the fourth, of recent inventions and variations—and in the fifth, of mounting the plates for the press.

Concerning the origin of this branch of the art, it may be said, that *the principle* of stereotype-printing, namely, the application of fixed immoveable blocks or pages which, once formed, would remain so far perfect as long as they endured free from damage, and by means of which the work could be frequently put to press, according as the demand might require, without incurring the expense of re-composition, and possessing all the advantages of preventing a great outlay of expense in paper and press-work, is coeval with the origin of printing. The modern stereotype art embraces the advantages afforded by the improvement of moveable fusil types in the easier and less expensive formation of the block or plate.

principles, from engraved copper-plates. The chief difficulty in effecting this has been, to invent such a combination of metals as will flux sufficiently, by a moderate heat, to receive the impression of the finest protruding parts of the mould (supposing that to have been perfectly taken), and will condense of equal hardness with beaten, rolled, or planished copper. This has not, as yet, been effected upon any certain or general scale: nor, if it were, do I believe that it can ever become of general practice or utility. But be this as it may, novelty is out of the question. A process very similar was partially effected at a period nearly coeval with the origin of printing, which undoubtedly laid the foundation of copper-plate printing. [See the article, in the Introduction, upon the engravings of Maso Finiguerra.]

The transfer of engravings has been most effectually accomplished by the Siderography of Mr. Perkins; but in this process the engraving must be previously executed upon steel, from which it is transferred to the copper.

I have made transfers by the stereotype process, with hard metal, of some very delicately engraved portraits, which to the naked eye look as perfect as the coppers themselves; but when brought to the test of the rolling-press, the porous nature of the metal occasions it to absorb the oil and ink, and the impression has a dark dingy appearance. Mr. Armstrong, an eminent engraver, thinks he has succeeded in this object both as to metal and process; but I have not yet seen his proofs of success.

Upon the question of the origin of the invention, as at present practised, Mr. Tilloch, editor of the Philosophical Magazine, has given in the tenth volume of that work, the following extract translated from a Dutch writer. "Above a hundred years ago the Dutch were in possession of the art of printing with solid or fixed types, which, in every respect, was superior to that of Didot's stereotype. It may, however, be readily comprehended that these letters were not cut in so elegant a manner, especially when we reflect on the progress which typography has made since that period. Samuel and J. Luchtmans, booksellers at Leyden, have still in their possession the formes of a quarto Bible, which were constructed in this ingenious manner. Many thousand impressions were thrown off, which are in every body's hands, and the letters are still good.

"The inventor of this useful art was J. Van der Mey, father of the well-known painter of that name. About the end of the 16th century he resided at Leyden. With the assistance of Muller, the clergyman of the German congregation there, who carefully superintended the correction, he prepared and cast the plates for the above-mentioned quarto Bible. This Bible he published also in folio, with large margins ornamented with figures, the formes of which are still in the hands of Elwe, bookseller at Amsterdam; also an English New Testament, and Schauf's Syriac Dictionary, the formes of which were melted down; and likewise a small Greek Testament in 18mo."

Since these pages were first compiled, a very intelligent and useful work has appeared, which I strongly recommend to the reading of all who make the art of printing either their business or amusement. "An Essay on the Origin and Progress of STEREOTYPE PRINTING: including a description of the various Processes. By Thomas Hodgson. Newcastle: printed by and for S. Hodgson, &c. 1820." Mr. Hodgson lays claim "to little merit beyond that of collecting into one publication a variety of information, which either lay scattered in different works, or was unknown to the generality of English readers." It is plain from his work, that he is equally excellent either as author or printer; without, however, any practical knowledge of the stereotype branch of the art. Considerable extracts are made by Mr. Hodgson from the Memoir of M. Camus "*Histoire de Stéréotypie*," 1802, 8vo.—of which I shall have occasion to avail myself. His exposure of the invention of Van der Mey throws a new, and much more rational, light upon the subject: he says, "this mode, which may be considered an intermediate link between the operations of common letter-press printing and those of stereotype, as practised at the present day, consisted in immersing the bottoms of the types, after the pages had been composed, and made quite correct, nearly up to the shoulder of the letter, in melted lead or solder, thus rendering the page one solid mass. In this manner, Van der Mey prepared for Samuel Luchtmans, bookseller of Leyden, the pages of a quarto and folio edition of the Bible, and of some other books. The way in which he prepared his pages having been misunderstood, or unknown to all the English writers who have yet noticed this subject, this artist has been constantly represented as the inventor of stereotype printing, in the usual acceptation of that term, an honour to which he is certainly not entitled. The authority on which I have ventured to give the above explanation of the process pursued by Van der Mey, is a letter, dated Leyden, June 24, 1801, addressed by Messrs. S. and T. Luchtmans, booksellers, of that city, to M. Renouard, of Paris. As this letter is very interesting, both on account of this explanation, and also for the notice it contains of the works on which this process was employed, I here insert a translation of it as published by M. Camus.

" 'We have sent you a copy of our stereotype Bible, which we take the liberty of offering you as a work truly interesting in regard to the history of the art. All the plates of it are now in our possession, and notwithstanding that many thousand copies have been printed from them, they are still in very good condition. They are formed by soldering the bottoms of common types together, with some melted substance, to the thickness of about three quires of writing paper. The plates were made, about the beginning of the last century, by an artist named Van der Mey, at the cost of our late grandfather, Samuel Luchtmans, bookseller. The same artist, at the same time, and in the same manner, also prepared for our grandfather the stereotype plates of a folio Dutch Bible; these plates are at present in possession of the bookseller Elwe; and afterwards of a Greek New Testament, on Brevier, and of 24mo size, the plates of which are still preserved by us. The last work which this artist executed in this manner, was the *Novum Testamentum Syriacum et Lexicon Syriacum*, by Schauf, 2 volumes, 4to; a work sufficiently known. The plates of this last work have been destroyed. These instances comprise, as far as our knowledge extends, all the attempts of this kind which have yet been made in this country.' This letter satisfactorily explains the nature of the process pursued by Van der Mey, and proves that the doubts which have been expressed respecting his right to the appellation of the inventor of stereotype printing were not entertained without foundation. The misconception which has arisen on the subject, has been chiefly occasioned by the incorrect statement which appeared in the *Niew Algemein Konst en Letter Bode*, for 1798. In the statement here alluded to, of which a translation will be found in the tenth volume of the *Philosophical Magazine*, page 276, Van der Mey is represented as having 'prepared and *cast the plates*,' an expression which certainly is not warranted by the fact." [Page 7—9.]

It must be perfectly obvious to all who, in the least degree, understand the subject, that Van der Mey's invention was any thing but an economical mode of printing. The vast capital which would be required by the cost of the type, with the additional expense of the block-forming process, together with the inconvenience of stowing the blocks of works of magnitude done after such a method, would be sufficient considerations to lead on the ingenious to devise some better plan. A mould from any page of type, in which a thin plate might be cast containing a fac-simile of the face only of the page, and which might be mounted upon wood, or other convenient material, to the usual height of the type, in order that the proper number of pages might be submitted to the same bearing or pressure between the two plane surfaces of the press as a forme of type itself would receive, is evidently the improvement that would be sought after. This, although an addition, in the first instance, to the cost of a work, would be far less expensive than the method of Van der Mey, yet would be equally effective, and attended with much less inconvenience in every respect.

When, or by whom this was first fairly effected, we have no means of accurately ascertaining. Our neighbours across the channel lay claim, of course, to the perfection of the discovery, and bring forward some plates of a calendar to a prayer-book, formed of *copper*, the workmanship of which is very rude and imperfect, as corroborative of their priority in the art. But these plates are entirely without a date as to the time of their execution, or the name of the workman by whom they were produced. Upon the assertion, however, of a compositor eighty years of age, and speaking from his memory in 1801 or 1802, that he had seen the plates used previous to the year 1735, it has been assumed that they were productions of the latter end of the seventeenth century. Now, even granting that this workman had seen plates used, previous to the year 1735, in Paris, it would be too much to give up to such argument the claim of the invention, when on this side the water we have positive names and dates of about the same period to show that the art was then practised in this and the sister-kingdom; that Mr. Ged, of Edinburgh, and Mr. Fenner and Mr. James, of London, absolutely cast plates for Bibles and Prayer-books in the University of Cambridge, in the year 1729-30.

The Dutch extract continues :—" As far as is known, Van der Mey printed nothing else in this manner; and the art of preparing solid blocks was lost at his death, or, at least, was not afterwards employed. The cause may readily be conceived; for, though this process in itself is very advantageous, it is far more expensive than the usual method of printing, except in those cases when such works are to be printed as are indispensably necessary, and of standing worth."—*Niew Algemein Konst en Letter Bode,* 1798. *No.* 232.

" If," says Mr. Tilloch, see p. 477, " founding could be applied to single letters, why not to pages, to get rid of a sacrifice of capital submitted to at first, because of the enormous expense of block-cutting! Founding of pages, on the first view of it, promises many advantages in point of economy; and to science it holds out, what can never otherwise be obtained—the possibility of procuring, in a short time, *IMMACULATE EDITIONS!** From books cast into solid pages, no more copies would be printed than might be wanted for immediate sale; the money thus saved from being sunk in paper to be piled up in warehouses for years, as at present, would serve as surplus capital to print other works; and thus the printer, his workmen, and the booksellers, would all be benefited (for it would be easy to prove, did our present limits allow it, that not only the business of the pressmen, but of the compositors, would be materially benefited and increased by the general adoption of such an improvement),* and all errors, as soon as discovered, could be rectified in the plates, to prevent them from appearing in after copies, instead of running through a large edition, as at present."

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* More of this in the sequel.

"In the year 1781, Mr. Nichols published an interesting pamphlet, entitled, 'Biographical Memoirs of William Ged;' including a particular account of his progress in the art of block-printing. The first part of the pamphlet, as the editor informs us, was printed from an MS. dictated by Ged some time before his death; the second part was written by his daughter, for whose benefit the profits of the publication were intended; the third was a copy of proposals that had been published by Mr. Ged's son in 1751, for reviving his father's art; and to the whole was added Mr. Mores's narrative of block-printing.†

"From this publication it appears, that so far back as the year 1725, Mr. Ged had begun to prosecute plate-making. In 1727 he entered into a contract with a person who had a little capital, but who, on conversing with some printer, got so intimidated, that at the end of two years he had laid out only twenty-two pounds. In 1729 he entered into a new contract with a Mr. Fenner, Thomas James a type-founder, and John James an architect. Some time after, a privilege was obtained from the University of

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* The experience of years has not proved this fact.

† This narrative gives rather a different account of the affair. It makes *Fenner* the original projector, and adds *James Gadd* at the tail of the partnership, "Who," he says, "was in the rebellion of 1745, a captain in Perth's regiment, was arraigned of high treason, pleaded guilty, and begged to be recommended to mercy; and his life was spared on account of his knowledge in this method of printing, which was thought to be useful: after he had obtained his pardon, he followed his business for some time as a journey-man, with Mr. Bettenham; afterwards, he commenced master for himself at a house in *Denmark*-court in the Strand: unsuccessful there, he privately shipped off himself and his materials for the other side of the *Atlantic*; and whether it were, that having escaped the *one* fatality he met with the *other* we know not; but nothing hath since been heard of him."—*Mores*, p. 61, 62.—This I have since found contradicted by Mr. Hodgson.

The pamphlet has been lately re-printed by Mr. Hodgson, of Newcastle.

Cambridge to print Bibles and Prayer-books. But it appears that one of his partners was actually averse to the success of the plan, and engaged such people for the work as he thought most likely to spoil it. A straggling workman who had wrought there, informed Mr. Mores, that both Bibles and Common-Prayer books had been printed, but that the compositors, when they corrected one fault, made purposely half a dozen more, and the pressmen, when the masters were absent, battered the letter in aid of the compositors. In consequence of these base proceedings, the books were suppressed by authority, and the plates sent to the King's printing-house, and from thence to Mr. Caslon's foundery.†

"After much ill usage, Ged, who appears to have been a person of great honesty and simplicity, returned to Edinburgh. His friends were anxious that a specimen of his art should be published, which was at last done by subscription. His son, James Ged, who had been apprenticed to a printer, with the consent of his master set up the formes in the night-time, when the other compositors were gone, for his father to cast the plates from; by which means Sallust was finished in 1736."* Of this work Mr. Tilloch has a copy, and the plate of one of the pages; as also of another work, printed some years after, from plates of Mr. Ged's manufacture. The book is "The Life of God in the Soul of Man," printed on a writing pot, 12mo, and with the following imprint: "Newcastle; printed and sold by John White, from plates made by William Ged, Goldsmith in Edinburgh, 1742." It is a very neat little volume, and is as well printed as books generally were at the time.

"Fifty years after the invention of Ged, Mr. Tilloch made a similar discovery without having, at the time, any knowledge of Ged's invention.‡ In perfecting the invention, Mr. Tilloch had the assistance and joint labour of Mr. Foulis, printer to the University of Glasgow. After great labour, and many experiments, these gentlemen 'overcame every difficulty, and were able to produce plates, the impressions from which could not be distinguished from those taken from the types from which they were cast.'

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* "The only successful experiment of Ged was a clumsy *Sallust*, in 8vo." Dibd. Dec. 343, *n.*

† But a remnant escaped from Caslon's cormorant crucible; and I have the opportunity of here presenting my readers with an opposite view of a pair of the very malefactors; and challenge any other to dispute the palm of venerable antiquity with them; they have been rather roughly treated, but besides the purpose for which they are here exhibited, will serve to show the style of type, typography, and stereotype of those days.

‡ Mr. Tilloch says so in the Philosophical Magazine; and, therefore, we must suppose he had not, at that time, seen the narrative, just read,

"Though we had reason to fear, from what we found Ged had met with, that our efforts would experience a similar opposition from prejudice and ignorance,* we persevered in our object for a considerable time, and at last resolved to take out patents for England and Scotland, to secure to ourselves, for the usual term, the benefits of our invention."

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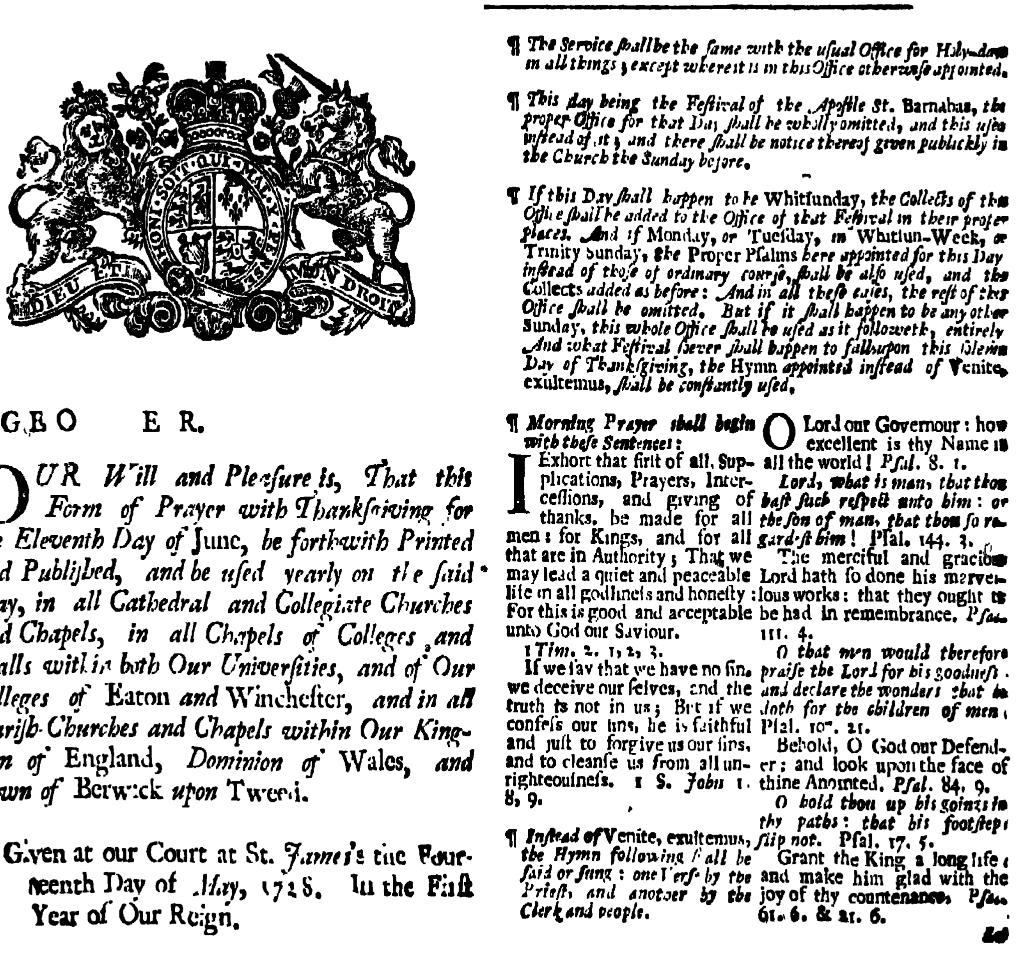
of Mr. Rowe Mores's Books, dated 1778, in which a tolerable outline is given of the practice of stereotyping, although not under so learned a name; but quite sufficient, if *any body else* had happened to have seen it at the time, to have raised a competitor to Messrs. Tilloch and Foulis.

* Of course, if they came Southward.


HONI SOIT QUI MAL Y PENSE
DIEU ET MON DROIT

G.EO E R.

O*UR Will and Pleaſure is, That this Form of Prayer with Thankſgiving for the Eleventh Day of* June, *be forthwith Printed and Publiſhed, and be uſed yearly on the ſaid Day, in all Cathedral and Collegiate Churches and Chapels, in all Chapels of Colleges and Halls within both Our Univerſities, and of Our Colleges of* Eaton *and* Wincheſter, *and in all Pariſh-Churches and Chapels within Our Kingdom of* England, *Dominion of* Wales, *and Town of* Berwick *upon* Tweed.

Given at our Court at St. *James's* the Fourteenth Day of *May*, 1728. In the Firſt Year of Our Reign.

¶ *The Service ſhall be the ſame with the uſual Office for Holy-days in all things; except where it is in this Office otherwiſe appointed.*

¶ *This day being the Feſtival of the Apoſtle St.* Barnabas, *the proper Office for that Day ſhall be wholly omitted, and this uſed inſtead of it; and there ſhall be notice thereof given publickly in the Church the Sunday before.*

¶ *If this Day ſhall happen to be* Whitſunday, *the Collects of this Office ſhall be added to the Office of that Feſtival in their proper places. And if* Monday, *or* Tueſday, *in* Whitſun-Week, *or* Trinity Sunday, *the* Proper Pſalms *here appointed for this Day inſtead of thoſe of ordinary courſe, ſhall be alſo uſed, and the* Collects *added as before: And in all theſe caſes, the reſt of this Office ſhall be omitted. But if it ſhall happen to be any other* Sunday, *this whole Office ſhall be uſed as it followeth, entirely. And what Feſtival ſoever ſhall happen to fall upon this Solemn Day of Thankſgiving, the* Hymn *appointed inſtead of* Venite, exultemus, *ſhall be conſtantly uſed.*

¶ *Morning Prayer ſhall begin with theſe Sentences:*

I Exhort that firſt of all, Supplications, Prayers, Interceſſions, and giving of thanks, be made for all men: for Kings, and for all that are in Authority; That we may lead a quiet and peaceable life in all godlineſs and honeſty: For this is good and acceptable unto God our Saviour.

1 *Tim.* 2. 1, 2, 3.

If we ſay that we have no ſin, we deceive our ſelves, and the truth is not in us; But if we confeſs our ſins, he is faithful and juſt to forgive us our ſins, and to cleanſe us from all unrighteouſneſs. 1 S. *John* 1. 8, 9.

¶ *Inſtead of* Venite, exultemus, *the Hymn following ſhall be ſaid or ſung: one Verſe by the Prieſt, and another by the Clerk and people.*

O Lord our Governour: how excellent is thy Name in all the world! *Pſal.* 8. 1.

Lord, what is man, that thou haſt ſuch reſpect unto him: or the ſon of man, that thou ſo regardeſt him! Pſal. 144. 3.

The merciful and gracious Lord hath ſo done his marvellous works: that they ought to be had in remembrance. *Pſal.* 111. 4.

O that men would therefore praiſe the Lord for his goodneſs: and declare the wonders that he doth for the children of men. Pſal. 107. 21.

Behold, O God our Defender: and look upon the face of thine Anointed. *Pſal.* 84. 9.

O hold thou up his goings in thy paths: that his footſteps ſlip not. Pſal. 17. 5.

Grant the King a long life: and make him glad with the joy of thy countenance. *Pſal.* 61. 6. & 21. 6.

Let

Owing to circumstances of a private nature, not connected with the stereotype art, the business was laid aside for a time, and Mr. Tilloch having removed from Glasgow to London, the concern was dropped altogether; but not till several volumes had been stereotyped and printed, under the direction of Messrs. Tilloch and Foulis.

Some time elapsed after this, when Didot, the celebrated French printer, applied the stereotype art to Logarithmic Tables,* and, afterwards, to several of the Latin classics, and to various French publications. It has been said, by the French, that the merit of the invention properly belongs to Didot; but, by what we have already laid before our readers, it is evident this cannot have been the case.

Some years after Mr. Tilloch had given up the prosecution of this art, Mr. Wilson, a printer of respectability in London, engaged with Earl Stanhope, for the purpose of bringing it to perfection, and eventually to establish it in this country. His lordship, it is said, received his instructions from Mr. Tilloch, and had afterwards the personal attendance of Mr. Foulis, for many months, at his seat at Chevening, where his lordship was initiated in the practical part of the operation, and, for which, we have been informed, he paid eight hundred pounds.

After two years application, Mr. Wilson announced to the public, "that the genius and perseverance of Earl Stanhope," whom he styles the inventor,† "had overcome every difficulty; and that, accordingly, the various processes of the stereotype art had been so admirably contrived, combining the most beautiful simplicity with the most desirable economy; the *ne plus ultra* of perfection, with that of cheapness."

In January, 1804, the stereotype art (with the approbation of Lord Stanhope) was offered, by Mr. Wilson, to the University of Cambridge, for their adoption and use in the printing of Bibles, Testaments, and Prayer-Books, upon certain terms and conditions;‡ and, both at Cambridge and Oxford, Bibles, Testaments,

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* This I doubt—*vide post.*

† Earl Stanhope had too much candour to call himself so.

‡ One of which was said to be, paying Mr. Wilson four thousand pounds for the *secret* of the *new invention!*

&c. have been very generally printed by this process. Stereotyping is much used, and very advantageously, for Primers, Spelling-books, School-books, Religious Tracts, and other works requiring no variation of editions, or great excellence of execution.

ADVANTAGES OF STEREOTYPE.

SECTION II.

Inquiry as to the probable Advantages of Stereotype—Controversy on the subject—Mr. Wilson's Reply, and Propositions in favour—Arguments in opposition—Calculations of relative Expenses.

Having thus detailed the several pretensions to the credit of inventing the art of Stereotype Printing, and it being but of modern adoption, or revival, in this country, it may not be improper, in the next place, to offer to my readers a general view of the discussions which have arisen, and been made public, upon its probable utility, and its advantages as compared with that by moveable types. The following paragraph appeared in the Monthly Magazine for April 1807.

" Stereotype printing has not been adopted by the booksellers of London, because it does not appear that more than twenty or thirty works would warrant the expense of being cast in solid pages; consequently the cost of the preliminary arrangements would greatly exceed the advantages to be attained. On a calculation, it has appeared to be less expensive to keep certain works standing in moveable types, in which successive editions can be improved to any degree, than to provide the means for casting the same works in solid pages, which afterwards admits of little or no revision. As the extra expense of stereotyping is, in all works, equal to the expense of seven hundred and fifty copies,* it is obvious that this art is not applicable to new books, the sale of which cannot be ascertained.† Although these considerations have induced the publishers of London not to prefer this art in their respective businesses, yet it has been adopted by the Universities of Cambridge and Oxford; and from the former some very beautiful editions of Common-Prayer Books have issued to the public. Probably the art of stereotyping applies with greater advantage to staple works of such great and constant sale, as Prayer Books and Bibles, than to any other."

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* How this calculation is made out, I am at a loss to understand.

† For this very reason, in some cases, it is the *most* applicable. *Vide post.*

In the next number of that work, Mr. Wilson made the following remarks in contradiction to the above statement:—

"In this statement there are several mistakes, calculated to mislead the public mind. It is due from me, not to the *booksellers of London*, particularly, but to the booksellers, and to the PRINTERS too, of England, Scotland, and Ireland, to the masters of public schools and private seminaries, to the governors of institutions for the gratuitous circulation of books, to all persons interested in the faithful and economical education of youth of both sexes, and in general to the whole literary world—it is due from me to bring forward something more than bare assertion upon the present occasion; to state what really are the advantages peculiar to stereotype printing, which I presume I am rather better qualified to do than are those persons who know nothing of the subject. [Excellent!] The advantages arising from an application of the stereotype invention to the manufacture of books, are not confined to any particular department of the printing business. In every department of expenditure they are as self-evident* as profitable, and need only to be mentioned to be well understood.

"1st. The *wear of moveable types*, in stereotyping, does not exceed 5 per cent of the heavy expense incurred by the old method of printing.—2ndly. The expenditure upon *composition* and *reading* is nearly the same by both methods, for a first edition: but this great expense must be *repeated* for *every* succeeding edition from moveable types; whereas, by the stereotype plan *it ceases for ever*.—3rdly. The expense of *stereotype plates*, when I am employed to cast them, is not 20 per cent of that of moveable-type pages.—4thly. The expenditure upon *paper* and *press-work* is the same by both methods; but it is not incurred at the same time. The old method requires an advance of capital for a consumption of four years; whereas, by stereotype, half a year's stock is more than sufficient. It follows, therefore, that twelve and a half per cent of the capital hitherto employed in paper and press-work is fully adequate to meet an equal extent of sale.—5thly. A fire-proof room will hold stereotype plates of works, of which the dead stock in printed paper would require a warehouse twenty times the size; and thus *warehouse-rent* and *insurance* are saved; with the additional advantage, in case of accident by fire, that the stereotype plates may be instantly put to press, instead of going through the tedious operations of moveable-type printing; and thus no loss will be sustained from the works being out of print.—6thly. In stereotype, every page of the most extensive work has a separate plate; all the pages, therefore, of the said work, must be equally new and beautiful. By the old method, the types of each sheet are distributed, and with them the succeeding sheets are composed; so that, although the first few sheets of a volume may be well printed, the last part of the same volume, in consequence of the types being in a gradual state of wear as the work proceeds, will appear to be executed in a very inferior manner.—7thly. The stereotype art possesses a *security* against *error*, which must stamp every work so printed with a superiority of character that no book from moveable types ever can attain. What an important consideration it is, that the inaccuracies of language, the incorrectness of orthography, the blunders in punctuation, and the accidental mistakes that are continually occurring in the printing of works by moveable types, and to which every new edition superadds its own particular share of error—what a gratifying security it is, that all descriptions of error are not only completely cured by the stereotype invention, but that the certainty of the stereotype plates remaining correct, may be almost as fully relied on as if the possibility of error did not at all exist!—If these observations be just with reference to the printing of English books, how forcibly must they be felt when applied to the other languages generally taught in this country; how much more forcibly when applied to those languages which are the native dialects of the most ignorant classes throughout the United Kingdom, but which are as little understood as they are generally spoken!—8thly. Stereotype plates admit of alteration; and it will be found that they will yield at least twice the number of impressions that moveable types are capable of producing.—Lastly. All the preceding advantages may be perpetuated, by the facility with which stereotype plates are cast from stereotype plates.

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* These *self-evident* propositions will be noticed in the sequel.

" Such is a general outline of the present state of the stereotype invention; and such are the obvious advantages arising from it to learning and to ignorance—to every state and condition of civilized life. From the whole it results, that a saving of 25 to 40 per cent will accrue to the public in the prices of all books of standard reputation and sale, which, I believe, are pretty accurately ascertained to comprehend THREE FOURTHS of all the *book*-printing of England, Scotland, and Ireland. It is fair to conclude, therefore, that the sales, both at home and abroad, will be considerably increased, and that the duties on paper will be proportionally productive; so that the public will be benefited in a twofold way by a general adoption and encouragement of the stereotype art. With this view, I think the period is now arrived when I ought to announce to all the respectable classes before-mentioned, particularly to printers and booksellers, that I am fully prepared to enable them to participate in the advantages to be derived from the stereotype art, in any way that may be most conducive to their particular interests, either individually or collectively."

We shall now, says Mr. Stower, state the arguments generally advanced in opposition to the practice of this invention.

"In the first place, the expense of the composition of every page (it being imposed separately, and two proofs, at least, taken from it before it can be in a proper state to undergo the process of making a plate from it) must be considerably greater than in the common mode.

"Secondly. In a first edition the bookseller has not only to pay for the higher-priced composition, but must be at the great expense of the stereotyping, which, in metal, independent of the charge for workmanship, is equal in weight to one fourth of the same work set up in moveable types.

"Thirdly. The printer in stereotype must use higher-priced presses than are now commonly used, and must consequently increase his charge per ream; for hitherto all stereotype works have been printed at the Stanhope press, and at these presses it has not been done at the *common price*.

"Fourthly. The shape and manner of the first edition *must* be continued, or the first expense must be again incurred; for no deviation as to plan or size can possibly take place, nor any advantage be reaped from the future improvements in the shape of types.

"Fifthly. The bookseller has, *at present*, the certainty, or nearly the certainty, of detecting, particularly in town, any unjust advantage which might be taken of him, in point of number, by those with whom he intrusts his works: that important security will be wholly done away by plate-printing. He must also be subject to the loss sustained by the damage of plates (a highly probable circumstance), together with fraud by the '*facility with which stereotype plates are cast from stereotype plates.*'

"We shall not now enter into any particulars upon this last, which we conceive most important, objection to stereotyping; it is, however, an objection that will not lose weight by examination, and may be well worth the attention of those who are hesitating whether the OLD PRACTICE or the NEW is the *safest.*"

Thus far Mr. Stower.

In giving my general assent to the foregoing arguments advanced in opposition to the sanguine calculations and statements of the gentleman before alluded to, I shall take the opportunity of adding a few words, dictated by experience, upon such points as appear to have been too slightly urged in the reply; and of submitting such other arguments, on both sides the question, as seem to me necessary to be taken into consideration, in order to fairly determine how far stereotype printing may be of advantage either to the bookseller or to the public.

First Proposition.

"The wear of moveable types in stereotyping does not exceed 5 per cent of the heavy expense incurred by the old method of printing." Now, if this proposition is really meant to be taken in the plain common sense of words, without reference to the different weights of the founts necessary to be cast for the two respective methods, facts will bear me out in advancing directly the reverse. I have cast from both old and new types, and have no hesitation in affirming, that the wear and-tear, in passing through the separate-page proving; through the process of moulding, and the requisite cleansing from the plaster, is as great to any page of type as would be suffered by *the working of ten thousand copies* at a good press, with good tympans and blankets. If, therefore, he mean, that a stereotype-founder may set up, or conduct his business with "5 per cent off the heavy expense incurred by the old method of printing," I will oppose to his assertion the actual experience of any one who has made the trial, and which I am sure will support me in stating, that it will require an *addition* of from 5 to 10 per cent upon all capital employed in the composing department.—Thus far no advantage can be shown to arise to printer, bookseller, or public.

Second Proposition.

" The expenditure upon composition and reading is nearly the same by both methods, for a first edition: but this great expense must be repeated for every succeeding edition from moveable types; whereas, by the stereotype plan, it ceases for ever." Now, I say, that the expenditure, in the first instance, is *not* nearly the same, but full 10 per cent more upon the composition and reading; and with great justice. High spaces are a considerable hindrance to a compositor; imposing each page in a separate chase is extra trouble; pulling proofs, with which the compositor has nothing to do in general practice, and for which purpose two pressmen could not be called from their regular work to pull sixteen or twenty-four proofs in lieu of one, for a sheet of 8vo, or 12mo, without compensation —hindrance to the compositor in distributing, from the oil and particles of gypsum left in the interstices of the pages from the moulding process—the more frequent necessity of leaving his frame to impose, correct, lay-up, &c.—the greater quantity of proof-paper destroyed in pulling by pages rather than by sheets will be at least as three to one—the waste of lye in washing single pages—the hindrance to the reading-room in reading by single pages—the sending out. proofs by single pages—as well as the greater wear of type, as confirmed in the preceding answer, are a combination of circumstances that sufficiently refute that part of the proposition which states the expense of composition, &c. to be " nearly the same," and which fully authorise me to say that 10 per cent addition to the common price would be barely adequate to repay the extra time and trouble required in the new process. And with respect to the second part, instead of the expense of composition being " wholly repeated for every succeeding edition from moveable types," I beg to say that subsequent editions may very well be taken at 10 per cent reduction of the terms from the first cost, as will be hereafter shown: and as to the assertion, that by the stereotype plan, "*it ceases for ever*," both reason and practice so flatly contradict it, that no further argument is necessary.

Third Proposition.

It would be difficult to argue this closely, because Mr. Wilson has not told us what he did charge when he was employed to cast plates.

Fourth Proposition.

Here it is alleged that, "the press-work is the same by both methods," which is *not the case*, for two reasons; first, because of greater trouble to the pressman in making ready; and secondly, because of going to press more frequently with short numbers, which is the very gist of the advantage held out by stereotype. The same proportion of price cannot be charged for working 500 or 250 as for 2,000. Four reams off type may very well be worked at 4½*d*. or 5*d*. *i. e.* 7*s*. × 4*s*. = £1. 8*s*.: but divided into single reams, or 500's, separate, off plates, they could not be done under 6*d*. *i. e.* 10*s*. × 4*s*. = £2.: and in 250's, even 7*d* or 8*d*. *i. e.* 12*s*. × 4*s*. = £2. 8*s*. per 2,000, would not pay expenses and labour. And besides the additional labour or time of the pressman* in making ready the plates, the master is at considerable expense in blocks, or apparatus, upon which the plates are fixed and raised to the height of type, to which all presses and machinery are adapted. And further, to place, or lay down those plates, a compositor alone can be possessed of adequate skill, and his time must be valued—a proof must be pulled, folded and followed—batters and other accidents looked after and repaired, if the printer have any regard to the appearance of the work; and this cannot be expected to be done free of expense to the bookseller. Thus, I think, it is clearly shown, that the press-work of stereotype plates must come to more, even considering interest, than by the old method.

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* Stereotype plates cannot be worked for the same price per ream as type-pages, unless a compensation is charged for the mounting and making ready: the trouble of preparation, to the pressmen, of even the very best-cast and most accurately-dressed plates, is considerable; and in very open works, from the height of the *field* of the plates, a frisket of the greatest accuracy, must be cut for each forme.

Fifth Proposition

is only true in part:—but who is to find the "fire-proof room," bookseller? or printer?

Sixth Proposition.

"Every page of the most extensive work has a separate plate: all the pages, therefore, of the said work, must be equally new and beautiful. By the old method the types of each sheet are distributed, and with them the succeeding sheets are composed; so that, although the few first sheets of a volume may be well printed, the last part of the same volume, in consequence of the types being in a gradual state of wear, as the work proceeds, will appear to be executed in a very inferior manner." This is a most captivating assertion, and although it may take some time to expose the fallacy of every point of this argument, it is necessary it should be done. Let us take the case, then, of an extensive work—say a quarto of one hundred sheets. To proceed with this work in *stereotype* it would be necessary to have type sufficient for eight pages.* The first four, call them A, B, C, D, are set up and moulded from. While this is doing, four others, E, F, G, H, are being prepared. In what types, then, are the next four, I, K, L, M, to be set up? Those certainly which served for A, B, C, D. Thus, for the eight hundred pages *the same types* would be moulded and cast from, no less than *a hundred times.*

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* It is difficult to make our employers understand why as much should not be set up of a work when it is to be stereotyped, as when only the usual routine of printing is to be employed. In the outset of this article, mention was made [p. 815] of the peculiar type, spaces, &c. necessary for the process, and which may be again referred to [p. 844]; these peculiarities unfit the founts for ordinary work, and they ought not to be used, but for moulding from; the inventors of stereotype never contemplated the setting-up of their work in whole sheets; if that had appeared to them indispensable, I will venture the assertion, that stereotyping would never have been attempted. However, now it has become a practice for whole sheets to be set up, worked first, and then stereotyped: this obliges a printer to have his stereotype founts as large as any other, or else to have high-spaces, quadrats, leads, &c. as extras to his usual founts. It is, no doubt, possible, at great inconvenience, to mould from low spaces, &c. the mould will then require great force to be separated from the page, the gypsum will be partly left behind in every space between the words, and be liable to break in large blotches in other parts; in the casts from such moulds, independent of other imperfections, the plates will be in some parts exceedingly thin: and in others filled with metal equal to the surface of the letters—this gives great additional work for the picker and repairer; as also the compositor, who, previously to distributing, must pick, with a bodkin, the particles of dried plaster from between the words. If, on

Now, in ordinary printing, how would it stand? No office in usual course of work could go on with such a volume with less than five sheets of letter. Thus, the types used for the first sheet, say B, would come round for the sixth sheet, G; and 800 pages is 100 sheets: the fives in 100 are 20: so that the same types would be imposed and worked from, just twenty times in the course of the work. Now, without any comment of mine—without referring to the argument before adduced concerning the wear of type by moulding, cleaning, &c. let any person, professional or not, look at the above statement, and judge of which of the two modes of typography it may with greatest truth be said, "that although the few first sheets of a volume may be well printed, the last part of the same volume, in consequence of the types being in a gradual state of wear and tear as the work proceeds, will appear to be executed *in a very inferior* manner."

Seventh Proposition.

"The stereotype art possesses a security against error, &c. that no book from moveable types *can ever attain.*" It is next assumed, with a confidence as though it were expected to be granted, that *the more editions the more errors*—"every new edition superadds its own particular share of error," a part of the proposition which I cannot admit without some qualification;*

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the other hand, proper stereotyping materials be used, and the sheet worked before casting, it will be impossible to prevent the unseemly appearance of many spaces blacking between the words and quadrats, leads, &c. in other parts not closely protected by the surrounding type; and which it is the business of the picker to cut out from the plate. This will explain, to those not printers, the appearances which are so unsightly, in many of the periodical (chiefly weekly) publications of the present day. This mode of proceeding will also cause an addition of expense, for imposing and otherwise preparing the pages for the foundry, after working, the compositor having completed his routine, for his first charge per sheet, has nothing to do with the second process.

* There may be, and indeed I am sorry to confess, from my own experience, that there have been, many instances in which works, given out by compe-

and from my own experience in printing, and my commerce with those connected with the art, it would be inexcusable in me, on this occasion, not to protest against so gross a calumny, and to do justice to the respectable part of the press, by stating, that it is perfectly *in practice* for an edition to be rendered more correct than that which preceded it, and to be improved in every respect. We know, besides, that these plates are not exempt from the same accidents to which type formes are liable in their progress of working. Who can, with the utmost care, ensure that no accident in making ready, flying the frisket, &c. shall befal a plate as well as a page? A circumstance daily happening in every printing-office, and which the compositor is immediately called upon to repair: while it is possible that in stereotype plates such accidents may totally interrupt the work, and require the damaged plate to be sent to the foundry to be repaired, or perhaps, from the extent of the damage, must be re-set and re-cast. Repairs of this sort are done by the awkward process of taking out the damaged part, by perforation of the plate, and inserting types having their shanks reduced, and then soldered in their places. Now, as in the *process of moulding and casting, contraction must take place in* every stage; the natural consequence will be, that the type so inserted will have a larger face than the type of the plate. I mean most distinctly to assert this: I never saw a single letter inserted

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tition of *lowest offer per sheet*, have, for the sake of a shilling or two under price, been taken from the houses which have had the trouble and labour of getting them up, often from the most imperfect and worst-written manuscripts in first editions—after much sending to and fro concerning copy and proofs—after a tedious correspondence with author by post or coach—after the breaking-in of compositors and reader to the peculiarities of author or editor—their looking forward, as a recompence for their time and toil, to the comparative ease of getting through future editions—that, after all, the reprint is perhaps submitted to a competition in price, when some master, who may unite in his own person the various departments of overseer, reader, and warehouse-man, will, to gain a little work, or a new connexion, make a reduced tender. These are the instances where nothing, more nor less, can be expected, than that of 'every new edition *superadding* its own particular share of error.' It would be wonderful, indeed, if it were not so. And it may here be added, that the office of reader is, when men of classical education are employed, the most delicate and expensive part of a printer's establishment. If that department be not judiciously and conscientiously attended to, the whole is merely "sounding brass and tinkling cymbals."

into a plate, which could not be distinguished by any practised eye: and no three or four letters together can possibly be introduced into the space of the same letters cut out of a plate in consequence of an accidental batter, or a failure in the casting, which is a very common occurrence. So that, even barring the chance of a letter or two not lining exactly, or not standing quite square with the other part, or any error being made in composition, the part amended must destroy the much-praised beauty and immaculateness of the stereotype work.

However, it must, in justice, be conceded to the other side, that even if a work has been read with all the attention possible both by printer and author, errors may escape; and even in re-printing from that edition, if its errors are detected, others may be made to the same amount; but in the case of stereotype plates the errors may be pointed out, and amended by the process I have just described, or even a page or pages be re-set and re-cast, while, in the other parts no errors can have been made.

Eighth Proposition.

"Stereotype-plates admit of alteration; and it will be found that they will yield at least twice the number of impressions that moveable types are capable of producing." Stereotype-plates certainly admit of alteration, as explained above: but as to working twice the number of impressions that moveable types are capable of producing, no one argument is offered to show even the probability of it. Only thus far it may prove true: being bookseller's property, they may work the plates twice, or ten times as long, perhaps, as they would allow a printer to work his type (at least they would take the advantage of changing the printer, if he would not promise a change for newer type), and would think the book doing well if it sold. But it is very well known that even type-metal is too hard to cast plates from. It must be lowered; that is, softened by an addition of lead: and though by frequent fusion it will require renovating by an addition of regulus of antimony, yet the hardest metal ever made for stereotype is only about one pound of regulus to four pounds of tea-lead; and it is even reckoned good enough if one to six be made the proportion: how then a softer metal than type will yield *twice* the number of impressions (meaning, of course, with only equal deterioration of face), not being proved by any thing but bare assertion, must stand as one of those inconsistencies which requires only to be stated to be sufficiently exposed.

Ninth Proposition.

The list of benefits, as given by Mr. Wilson, concludes—"Lastly, all the preceding advantages may be perpetuated by the facility with which stereotype plates are cast from stereotype plates." One objection arising from this proposition, has been hinted at as very *probable*, in the fifth answer; but I have others which I think still more important to bring forward. It cannot, of course, in thus hunting after savings out of printer's work and profits, be meant to cast duplicates, or triplicates, &c. &c. of the plates in the first instance. Indeed the words can hardly be wrested to any other meaning but one; and that one I am anxious to bind it to: namely, that the advantages may be perpetuated by casting new plates from *the old ones!* Is it by thus multiplying stereotype-plates from stereotype-plates that works are to be renovated with "all their pages equally new and beautiful?" The very essence of stereotype consists in the faithful impression given of the original; and will not the stereotyper be prepared to see his new-cast plates exhibiting a fac-simile of every accident, imperfection, and effect of friction occasioned by the seven or eight years wear and tear of the original plates? Why any one would be a fool who would not rather determine to work his old plates everlastingly, than re-cast them, at a considerable expense, with all their blemishes and defects. What then is to be gained, let me ask, by the facility with which stereotype-plates may be cast from stereotype-plates?

As to the possibility of *fraud* by this vaunted facility, as hinted in the fifth answer, I think less of that than of any other point; because it does not always follow, that the plates shall remain in the hands of printers who are stereotypers, or that *they* can be the *only* rogues. Any thing unfair is far more likely to happen at the time of the *original casting*. It would require some little variation in the apparatus to mould from plates; but it would be about the easiest thing in the whole business to take duplicate moulds from the type originally. I have seen, where nothing improper was attempted, duplicates, triplicates, and more, of pages cast only by taking so many moulds. In fact, I never yet heard, in my intercourse with the booksellers, a suspicion of such a fraud being effected as casting plates from plates, for the best of all reasons—it could, by a scientific man, be detected, *to a certainty*, in every page.

Tenth Proposition.

The next point of inquiry appears to be the SAVINGS. "From the whole it results that a saving of from 25 to 40 per cent will accrue to the public in the prices of all books of standard reputation and sale." If the works forming the far greater proportion of those to which stereotyping is most applicable, because in them no variation of text can possibly be wanting, namely, Bibles and Prayer-books, were open to a fair competition of trade, there might be some truth in this; but while those works are subjects of the monopoly to the patent printers, *the saving* is rather unequally divided, as those persons have hitherto kept the great advantages to their own share: still I would not be understood as denying that, by a judicious selection of works, and proper management, in liberal hands, the public may in some instances be benefited. Standard works of magnitude and expense, and consequently slow progress through the press, would require so large a capital to be sunk for workmanship and paper, before any returns could be made, that they would become so much enhanced in expense, as to prevent, perhaps altogether, the undertaking.

In Rees's Cyclopædia, Art. "Stereotype," is a calculation of the alleged advantages of stereotype, as given in a pamphlet published by Mr. Brightly, of Bungay, in Suffolk. "Mr. Brightly, who practised the method of stereotype for some years, having made several estimates, and who, being himself a printer* as well as publisher, could have no inducement to give an exaggerated statement on either side of the question, seems to doubt if there be any saving whatever in the new process." I have never been able to obtain even a sight of his publication. But Mr. Hodgson, in his Essay on Stereotype Printing, has given some very detailed calculations on the subject, which will be found well worthy consideration. I might not agree with him in the precise value of some parts of the workmanship, nor in assuming that any booksellers, particularly in the trade of the metropolis, would go to press with so small an impression as a half-year's consumption; at the same time, he having under-rated the expense of casting, his calculations may, upon the whole, approach very near to the truth; I shall give his statement in preference to Mr. Brightly's:—

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* It may be said, that Mr. Brightly was not a printer by regular profession:—he was a schoolmaster, which pursuit he relinquished upon obtaining an insight into the typographic art at Bungay, in Suffolk. He carried on business to a great extent, and, from various circumstances, being enabled to do his work *very cheaply*, obtained a great deal of the London Booksellers' work, at a time when printing in London was in a state of considerable depression. He executed his business chiefly by *females!*

> "Mr. Wilson's concluding assertion that a saving of £25 to £40 per cent will accrue to the public in the prices of all books of standard reputation and sale, has been combated at some length by Mr. Brightly, who has entered into a variety of calculations to show the little probability there is of such a circumstance taking place. These calculations are made upon the supposition that the plates are charged according to Mr. Wilson's estimate of £20 per cent of the value of the types. The result is very unfavourable to stereotype printing, as whether the book be printed on pica or nonpareil, the original cost of the plates will not be defrayed till after the sale of more than three editions, and the saving in the price of each book can never be to the extent stated by Mr. Wilson. As, however, a different method of charging for the plates now generally prevails, much more favourable to stereotype, especially when the works are printed on small letter, I shall not copy these calculations, but insert others more consonant to the present practice of the trade. They will, I think, materially tend to give a proper view of the advantages and disadvantages of stereotype printing.
>
> "I shall suppose, that a bookseller wanted to print a work of twenty sheets octavo, on long-primer letter, of which he sold, on the average, 1,000 copies annually; and examine what advantages or disadvantages will result from an impression of 4,000 copies, the common way, to last four years, and the same work on stereotype, 500 copies every six months; allowing the paper, in both cases, to cost him 30*s*. per ream.

PRICE OF COMMON PRINTING.

	£.	*s*.	*d*.
Composing by the scale price, at 21*s*. with profit thereon	31	10	0
Reading and profit on it	7	17	6
Presswork at 5*d*. or 8*s*. per ream	64	[illegible]	0
Total charge for printing	103	7	6
160 Reams of paper, at 30*s*.	240	0	0
Cost price of 4,000 copies	343	7	6

"To this must be added the interest of money; but as the bookseller is supposed to have one-eighth of his stock returned every six months, the interest on £343 7*s*. 6*d*. is not to be charged for the whole four years, but only on such parts successively as remain unsold—it may therefore be estimated thus :—

	£.	*s*.	*d*.		£.	*s*.	*d*.
For the first six months .	343	7	6	=	8	11	8¼
Next ditto, seven-eighths unsold .	300	9	3¾	=	7	10	2½
Ditto, six-eighths unsold .	257	10	7½	=	6	8	9
Ditto, five-eighths unsold .	214	12	2¼	=	5	7	3¾
Ditto, one-half unsold . .	171	11	8	=	4	5	10
Ditto, three-eighths unsold .	128	15	3¾	=	3	4	4½
Ditto, one-fourth unsold .	85	16	10½	=	2	2	10¾
Ditto, one-eighth unsold .	42	18	5¼	=	1	1	5¼
Amount of interest					38	10	6
Cost price of 4,000 . . .					343	7	6
Total for a four years' consumption .					381	18	0

"Let us now calculate the expense of the same work in the stereotype manner, six months' consumption being printed at a time.

PRICE OF STEREOTYPE.

	£.	*s*.	*d*.
Composition (a farthing extra) 22*s*. with profit . .	33	10	0
Reading, with profit on it	8	5	0
Press-work on 500, at 6*d*. or 10*s*. per ream (though 12*s*. has been regularly paid for 500) . . .	10	0	0
Expense of printing . . .	51	5	0
Casting of plates at 40*s*. per sheet (Mr. Wilson's estimate would be at least 70*s*.)	40	0	0
Twenty reams of paper at 30*s*.	30	0	0
	121	5	0
Interest for six months	3	0	7½
Cost of first 500	124	5	7½

SECOND EDITION OF 500.

	£.	*s*.	*d*.
Paper	30	0	0
[illegible]ss-work, as before	10	0	0
	40	0	0
Interest for six months	1	0	0
Ditto on composition, reading, and plates, expended on first edition	2	0	10½
Cost of second 500	43	0	10½

	£.	s.	d.
(Brought forward) Cost of second 500	43	0	10½
Multiply this seven times			7
	301	6	1½
Add cost of first edition of 500 . .	124	5	7½
Price of 4,000 by stereotype printing	425	11	9
Ditto by ordinary printing . .	981	18	0
Balance against stereotype at the end of 4 years	43	13	9

SECOND EDITION OF 4,000.

"The money expended on the composition and reading of the first stereotype edition will now have been nearly returned; interest, therefore, ought only, in the subsequent editions, to be charged for the balance remaining due at the end of the first four years; but as the plates will have been some time in use, a charge will now begin to be made for repairs, &c. The expense of the subsequent stereotype editions of 500 will therefore stand thus:—

	£.	s.	d.
Paper	30	0	0
Press-work, as before	10	0	0
Repairs, at the lowest	1	0	0
	41	0	0
Interest for six months	1	0	6
Interest of balance of £43 13*s.* 9*d.* for six months	1	1	10
Cost of every 500 of second 4,000	43	2	4
			8
Cost of second 4,000 by stereotype	344	18	8
Ditto, by the usual method, as before	381	18	0
Balance in favour of stereotype on second 4,000	36	19	4
Deduct this from the balance remaining after the first 4,000	43	13	9
Balance against stereotype after 8 years .	6	14	5

THIRD EDITION OF 4,000.

				£.	s.	d.
By the ordinary method, as before . .				381	18	0
By stereotype—Paper . .	£30	0	0			
Press-work	10	0	0			
Repairs, &c. now increased	1	10	0			
	41	10	0			
Interest for six months .	1	0	9			
Ditto, for balance of £6 14*s.* 5*d.*	0	3	4¼			
	42	14	1¼			

(Brought forward)	£42	14	1¼			
Multiply this eight times . .			8			
Cost of third edition of 4,000 . .				341	12	10
Balance in favour of stereotype on third 4,000 . .				43	5	2
Deduct from this, balance remaining . . .				6	14	5
Balance in favour of stereotype at the end of 12 years .				33	10	9

"So that from this calculation (which I do not know to be incorrect) it appears, that it will not be till the tenth year that any profit can be derived from stereotype printing. And that after all charge shall cease on account of the original cost of the plates, the expense of each edition of 500 will be about £42 10*s.* or £340 for 4,000 copies, leaving a balance in favour of stereotype of £41 18*s.* on every 4,000 copies, or about 2½*d.* per book, which includes all advantages arising from any saving of capital. Since, therefore, no greater a saving than 2½*d.* per book is derivable from stereotype printing, it must be evident to every one, that Mr. Wilson's assertion, that a diminution of 25 or 40 per cent will arise in the price of books can never be realised.

"The above calculations are made upon a book printed on long-primer, as being a fair medium size; with smaller-sized type, the advantages in favour of stereotype will be greater; for when the composition and reading of a sheet amount to more than 40*s.* the expenses of plates will be defrayed by the second edition of 4,000.

"It has been stated that the advantage of stereotype arises principally from the saving of capital and interest; this will be rendered apparent by the following brief recapitulation of the preceding statement, discarding all calculations of interest.

				£.	*s.*	*d.*
Cost of 4,000 copies by ordinary printing . . .				343	7	6
Ditto by stereotype, first 500 . . .	£121	5	0			
Seven subsequent do. at £40 .	280	0	0			
				401	5	0
Balance against stereotype at the end of 4 years .				57	17	6

SECOND EDITION OF 4,000.

	£.	*s.*	*d.*
By ordinary printing, as before	343	17	6
By stereotype, 8 editions of 500, at £41	328	0	0
Balance in favour of stereotype on second 4,000 .	15	7	6
Deduct this from former balance	57	17	6
Balance against stereotype at the end of 8 years .	42	10	0

"So that at the end of eight years there is still remaining against stereotype a balance of £42 10*s.* which will require about eleven years more

> to clear; and each edition of 4,000, after the lapse of nineteen years, will leave a profit of £15 7[illegible] 6*d.* only.
>
> "Mr. Brightly enters into a similar calculation, to prove that on long numbers the stereotype system of printing is absolutely disadvantageous; but it is, I think, unnecessary to follow him, as it must be evident to every one, that where any thing extra is paid for press-work, such extra charge must, when the numbers are great, soon counterbalance any advantage arising from the saving of composition."

But it is still to be recollected that the plates will have become so much the worse as so many years wear, and accidents from having been put so often to press, will certainly have made them!—No inducement to purchasers by the sound or shape of "A New Edition," can be put forth. And if, by the device of a new title, the number of the edition be added at every successive impression, it will only be saying, as in human life when past its prime, so much the worse for wear!

Another drawback from the advantages of stereotype will result from the successful adoption of machinery for *type-printing*. The saving of cost in the working cannot be gained to the same extent upon plates as upon type, even if large impressions are worked, but which it is the principal object of stereotype to avoid. There is great disadvantage in *making-ready* plates, by the time consumed in fixing them upon the blocks or raisers in the first instance; next, by *underlaying;* then by want of the tympans to carry *overlays,* and a frisket, to prevent the high quadrats, flanches, claws, &c. at the extremities of the pages from appearing in print; and there is also more liability, from the concussion of the reciprocating movement of the machines, of the shifting of the plates; add to which, the plates, by the cylindrical pressure travelling over their surfaces, are very subject, if not fastened to the blocks or raisers in an extraordinarily secure manner, to warp and break, and then, as before-stated, the time taken for any repairs is so much more valuable when a machine is stopped, that is calculated to be going at the rate of two thousand impressions per hour (one thousand each side) than when at a press doing only one-eighth of that quantity, that although I have worked a great many, yet I doubt very much whether I shall ever attempt another plate at my machine.

For the purpose of showing, in a yet stronger light, that every edition of a stereotyped work must necessarily be, in a course of years, much worse in appearance, than would the same editions of the same work be, if done in the usual mode of printing, I am disposed to make some additions to the fourth answer. It has been well observed, that " the shape and manner of the first edition must be continued : no deviation as to plan or size can possibly take place ; nor any advantage be reaped from the future improvements in the shape of types." Of how much importance this consideration must be, let any one, to form a judgment, compare the editions of a work printed in any respectable office, for ten years past, where the types are kept in a constant round of use, and wear, and replenishing ; and it will, to a certainty, be found that each edition has had the advantage of progressive improvement in types. To give an example in my own practice, I will take the work I have before had occasion to mention, viz. Nelson's " Fasts and Festivals," going back to the year 1805, when it was printed by my predecessor, Mr. Rickaby. In 1807 it was put into my hands to reprint. The type (pica) it was before done in, was then found to have been, in the mean time, so much worn, that I was under the necessity of using one of some years later casting. In 1811 it was again reprinted ; in those four years that fount had done its service, and the book gained a still more modern type. In 1814 and 1818, precisely the same circumstances again recurred. Thus, in five editions of the work in thirteen years, the routine of wear and tear gave the advantage of progressive improvement in type to each edition ; and that not to a work requiring any particular display of elegance or good printing ; and I may further add, and can *prove*, that, without any thing more than proper attention in the reading department, the correctness of the editions has been improving also. Now what would have been the case, if the work had been stereotyped in 1805 ? Instead of being put to press five times, it would probably have been so put thirteen times. Each movement of the plates and putting to press would have been attended with, at least, liability to accident ; for every printer knows that the work of fixing the plates ; the process of making-ready ; working ; taking-off ; cleaning ; and packing up again, must be attended with a great chance of batters ; besides the mislaying or transposing a plate ; wear, by frequent use of the lye-brush ; and all the casualties which occur in a press-room. *The face of the type must have re-*

mained the same; errors could not, as in the ordinary mode of work, have been corrected, because the work would never have been read for that purpose; batters must have multiplied; and the work would have been gradually sinking, instead of rising in appearance to meet the improved state of modern printing. And suppose it were determined to re-stereotype from new type, the plates would not then, by weight, as metal, go one-fourth of the way to pay expenses, as would type. A strong confirmation, relative to what has been here stated, is afforded by the fact, that the University of Oxford, after its vast expenses, first, for the secret—next, for the foundry—and, lastly, but perhaps of greatest amount, for years of experience, have partially abandoned it, and have set up entire works in moveable types, in the persuasion, not only that the public would be supplied with better books as to typography, but that they would ultimately find an advantage to their own funds in recurring to the anti-stereotype plan—and, I am assured, from the best authority, that they are confirmed by experience in that opinion.

In the foregoing pages I have, like my predecessors, sought to combat the extravagant encomiums upon the universal, immaculate excellence and beauty of stereotype: yet, where those qualities are not indispensable, it will, nevertheless, be sometimes useful in a pecuniary point of view; and this, not only in works which are supposed never to be altered, but even in those which require, from their nature, frequent alterations. For instance, a work like The Picture of London—it is much more the interest of the bookseller to stereotype the work; print short numbers; and be at the expense of now and then a new plate to make requisite additions or corrections, than to lock up capital by printing, to save composition charges, a number equal to three or four years consumption of a work, which, from its nature, is deprived of a material portion of its interest, if it be not frequently published, "corrected to the present time." In logarithmic tables, the correctness of which is of the highest importance to the safety of navigation, and which once rendered, if possible, faultless, must remain FOR EVER the same; where the mass of figures may be called immense, and the composition, as tablework, in small type, is very expensive, stereotyping will be particularly valuable. In fact, for this very application, it is said, the stereotyping art was revived in France by that eminent artist in our profession, Didot;* and I have lately been engaged in applying the same process to the same purpose.

In smaller matters, stereotyping may also be profitably employed. For instance, if large numbers are wanted of a single leaf of prospectus; the first setting-up being accomplished, it will be both a saving of time and expense to stereotype for the other seven pages, and work a forme of octavo. Wood engravings, applicable to more works than one, or forming ornaments for the trade, may thus be multiplied at small cost; but by a particular process unnecessary to be described in this treatise. In the case also of very expensive type, it will be better to have only sufficient for four or five pages, and stereotype, than to have enough for two or three half sheets, and to go on with the work in the ordinary mode.

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* It appears from a note in Mr. Hodgson's Essay, p. 92, that it may very reasonably be doubted, whether Didot really did effect this work by casting of stereotype plates. "In the year 1795, Firman Didot published an edition of the *Tables des Logarithmes*, by Callet, which he announced as a stereotyped work. But it certainly was not a book of this description, at least, in the common acceptation of the term, it having been merely printed from pages of types which, after being corrected with the greatest care, were immediately rendered a solid mass, by the bottoms of the types being soldered together much in the same manner as was practised by Van der Mey, in Holland, about the beginning of the last century"—[see p. 818.] "It is also mentioned, as a matter of some magnitude, that Gatteaux formed a plate of Borda's Logarithms, containing *more than* 3,000 *figures*." I shall now begin to think that England has applied the art to this beneficial purpose to a far greater extent than either Didot or Gatteaux; and that I have the honour of being the artist by whose labours the assertion has been verified in the stereotyping of the Logarithmic and Trigonometric Tables to Kerigan's Nautical Astronomy, one plate of which contains more than 7,000 figures.

PROCESS OF STEREOTYPING.

SECTION III.

Minute detail of the art of Stereotyping—Form of the Type, Quadrats, and Spaces—Chases and previous preparation—Stanhope Manuscript, with Observations upon each head—Stereotype Imposing-furniture—The Gypsum—The Foundry; its Fittings up and Fixtures—The Moulding Process—The Oven for baking the Moulds—The Process of Casting—Various utensils required—The Picking Process—The Lathe for turning the backs of the Plates—Metal for Casting Plates.

"The first object of attention," says Mr. Brightly, "in this department, is the form of the type most convenient for casting plates. In new founts, the letter-founder should be directed to leave the body of the letter square from the foot to the shoulder; the leads and spaces corresponding in height with the shoulder of the letter; so that, when standing together in a page, the whole may form one solid mass, with no other cavities than what are formed by the face of the letter. The composition of which the moulds are to be made, when applied to such pages, having no interstices to enter, and being indented only by the face of the letter, may be easily separated: but if cavities be left in the page, the mould will unavoidably break, and injure the impression.

"The quadrats should be cast rather lower than the shoulder of the letter, about one-third of the depth of Pica. Otherwise the plate, which corresponds with the page, will be inconvenient to work at press: for where the whites are considerable, and the quadrats nearly the height of the letter, it is difficult to prevent the fouling of the paper. But if the quadrats be cast lower, this inconvenience will be avoided; and the cavities formed by these quadrats being large and shallow, there will be little difficulty in separating the moulds from the pages. If the composition break in those cavities, which sometimes happens, it is of little consequence, as it does not affect the face of the letter; and the metal may be afterwards reduced where it stands up too high. As the thickness of the plate, however, must, in some measure, be regulated by the position of the quadrats, care should be taken not to have them sunk too low, or the plate, when cast, will have holes in the places where the quadrats stood.

"Each work should be provided with four, five, or six small chases, according to the nature of it, so as to lock a quarto page, or two octavos or smaller ones. Previous to its being delivered to the founder, the compositor's work must be carefully examined to see that every correction has been made; that it has been imposed with the brasses or leads on each side, to form the flanch of the plate by which it is to be fastened to the block or raiser; that it has a thick lead at head and foot to protect the head and signature lines; that it has been locked up perfectly square, and very tight; or the effect which is commonly termed suction, will occasion the mould to draw up even the whole page; that it has been accurately planed down, washed well with lye, and rinsed with clean water after the pulling of the last proof; and the moulder must take care that it be perfectly dry, as the least moisture will prevent the due effect of oiling, and the mould will certainly break; particularly if it touch any damp reglet or furniture."

I am now arrived at that part of my work at which the STANHOPE MANUSCRIPT will be introduced, with such observations of my own as may show any variation in practice which experience and convenience may have suggested since his lordship's time.

"*Stereotype Imposing Furniture.*—The stereotype imposing furniture for a page consists of an iron frame, an iron side-stick and foot-stick, an iron head, and two, three, or four iron quoins, with four bevelled brasses, to give a slope to the edges of the stereotype plate. Chases are made of different sizes and shapes, suited to folio, quarto, octavo, &c. But the thickness of all chases and furniture should be strictly conformable to a given height; for upon their truth in that respect depends the perfection of the thickness of a stereotype plate.

"It being taken for granted that types are, what they ought to be, all of the same height, my object, in constructing this new imposing furniture was, to obtain a uniform level around the page, without which, the stereotype plates must vary in respect to thickness, exactly to the degree of imperfection which belongs to the furniture. It is, therefore, essential, in the first place, that the imposing chase and its apparatus be made correct in these respects; and, in the second place, that in the stereotype workman's hands, they be made to lie fairly upon the moulding table; for, though the furniture may be well made, yet, if there be any want of cleanness in this part of the operation, or such inattention as to allow any part of the furniture to stand higher up than its true level, an inequality in the thickness of the stereotype plate will take place from that cause.

" I adopted the use of metal furniture all round the page, in the persuasion that it was better calculated to preserve the page in its proper shape, than if wooden furniture were made use of."—*Stanhope Manuscript.*

OBSERVATION I.

I have preserved Lord Stanhope's description of his apparatus in this instance, as I shall in others, for the satisfaction of those who have already adopted, or may choose to be informed concerning his elaborate and expensive mode. The necessity of being more economical has simplified the stereotyping apparatus in this, as well as in many other parts. My foundry was erected upon the principle of having every thing as effective, but at as little expense, as possible; and after having given Lord Stanhope's (perhaps more perfect) mode, I shall submit that which I find practically good, and, withal, much less expensive.

Such very nice preparation of the furniture and chases is by no means necessary. Common cast-iron job-chases, and wood furniture, cut a little higher or thicker than ordinary, is all I find called for in this particular. But this is owing to an improvement and simplification of the moulding-frame, which will be hereafter described. Any variation in the thickness of the plates is corrected by the lathe, which must, at all events, be resorted to; as it will be impossible to meet with every plate of one uniform substance in the most expensive and best mode of casting. Bevelling off the side brasses or leads will also be wrong, as there would then be a difficulty in getting the chops of the chuck of the lathe to take good hold: and by a plane and block, of simple contrivance, the bevil is quickly made as the final process of preparing the plate.

" *The Gypsum.*—Gypsum, or plaster of Paris, the well-known material of which statuaries form their figures, models, moulds, &c. serves for making moulds for the stereotype plates, when mixed up with water, in the manner detailed under the Section descriptive of the moulding process.

"It is necessary to attend to several circumstances, in order to have it in a good state for stereotyping. Previously to being burnt, in order to prepare it for making the moulds, it should be broken into pieces, none of which should exceed the size of a hen's egg. When broken, it is put into the upper oven, in pans which are supported at a distance of three inches from the bottom of the oven, in order that the pans may not be unequally heated by resting on the bottom; and, calculating from the time when the heat is capable of keeping tin in fusion, it will be found that three hours burning will prepare enough of gypsum for ten or a dozen moulds; if more gypsum is wanted to be prepared, a longer time for burning may be allowed, or an increased heat given to the oven; but to lengthen the time of burning is preferable, as thereby the gypsum is more equally prepared from the outer surface of its masses to their cores. Care should be taken neither to burn the gypsum too much, too little, nor unequally. If it receive too much burning, it will, when mixed with the usual proportion of water, look too thin, have a gritty appearance, and exceed the proper time which it should take in becoming firm enough to be detached from the types. If it be under-burnt, it will be found to set too rapidly, not affording time sufficient to dab the page, while thin enough for that purpose; and will be adhering so firmly to the shaking tool, at the time when it is to be cleaned, as scarcely to be detachable from it. It will also, in the under-burnt state, be very injurious to the dabbing brush, by clogging it with gypsum nearly to the points of the hair; and to cleanse it from clogged gypsum tends very much to tear it in pieces. Well-burnt gypsum possesses the characteristics of steering clear of both these extremes. It allows a very adequate time for shaking; has the appearance of fine thick cream when poured upon the types; allows good time for dabbing the page well; is still thin in the dabbing brush and shaking tool, when the workman, after dabbing, sets about cleaning them; and it is only when gypsum is in this well-burnt state, that reliance can be placed upon the moulds being secure against cracking when immersed in the metal-pit.

"If gypsum be burnt unequally, that may arise either from the pieces being too large, so that their outer surfaces may be quite done though their cores be very far from having received enough of heat; or though the pieces of gypsum be of a proper size, if too great heat be applied, by which the outer surface may be over-burnt, and the inner under-burnt. Gypsum, in this state, is not so easily detected at the time of moulding, for it then has very much the appearance of being well-burnt, probably, from the extremes counterbalancing each other; but it is mortifying to the workman to find, that when moulds, made of such gypsum, are immersed in the type-metal, they are almost invariably spoilt by cracking.

"After the gypsum is thus prepared by burning, it is to be pulverized very finely, and sifted through a sieve not having less than 40 meshes in an inch. For pulverizing the gypsum, I have contrived an apparatus, which acts in resemblance to the grinding of flour in a flour-mill. I inclose the sieve for sifting under a table, to prevent the fine particles from being lost by flying off, and also to keep every thing else near it free from being covered with it."—*Stanhope Manuscript.*

OBSERVATION II.

In the metropolis, where plaster of Paris can be had ready prepared, this direction for its manufacture will not be of much utility: but it contains, at the same time, so many excellent cautions, pointing out remedies in the course of process, that it cannot fail of being acceptable in every foundry. Three sorts of plaster are prepared by the statuaries: the second degree of fineness is that chiefly used for moulding from type. It must be kept perfectly dry, and free as possible from air. Even in this state it will often require to be baked in the oven before mixing.

The foundry will not require any great space or expense for casting the compositor's work of one office; but must, of course, be proportionate to the concern intended to be carried on. "A room sixteen or eighteen feet square will be sufficient to forward as many pages as can be set up by fifteen or twenty compositors; and it should be well ventilated to prevent the fumes of the metal from injuring the workmen." Thus, if circumstances admit of it, the melting-pits should be set in the space of a large chimney-opening, with the flues ascending three or four feet up the chimney on each side, leaving a large vent in the centre, and by having a door or window on the opposite and each other side of the room, such a current of air may be gained over the melting-pit as will effectually carry away the noxious vapour and heat up the chimney, and leave the foundry as clear from either as any room in the printing-office. Such is the plan I have adopted, which will be clearly understood by the following sketch:—

A trough for speedily cooling the casting-pots and metal should be so placed as to be equally contiguous to the circuit of the crane and to the melting-pit. The other conveniences and apparatus necessary are as follow:—a moulding-table or bench, with pieces of perfectly level marble, or stone, or cast iron, with turned plane surfaces, about eighteen inches or two feet square, to contain three or four of the chases, in order to form the moulds from the pages—another common wood bench or table; with some shelves to lay plates, moulds, tools, &c. upon; which may be placed wherever the workman pleases. The material fixtures are, the melting-pit and its furnace; the oven and its furnace; and the crane; the pit being set so far projecting into the room as to allow of the tackle of the crane being suspended over its centre. If a second oven could be added, for heating the pots in which the mould is inclosed, before the immersion into the metal-pit, it would be a great convenience. The crane may be made of either wood or iron; but it must be so arranged as to swing over the centre of the pit, as well as of the cooling-trough.

These erections being completed, the stereotyping process commences with the moulding, which I shall describe from the Stanhope Manuscript.

"The work of the stereotype manufacturer begins at that part of the compositor's business when the pages are finally corrected, and made ready for press; at which stage, instead of [being imposed, read, and] going directly to press, in order to print off the number of copies wanted, the pages are delivered to the stereotype workman, who proceeds in the following manner:—

"1st. Not reposing implicitly upon the compositor for putting into his hands the pages in a state sufficiently clean and dry for stereotyping, the stereotype workman examines them in these respects; as he is well aware that either of these causes would prevent the mould from being good; especially the circumstance of the types being wet or damp; for, in such cases, the purpose of oiling the types [as explained beneath, in the 3rd article of this section] would be defeated.'

"2ndly. When the stereotyper has ascertained that the types of a page are clean and dry, he places the said page upon one of the moulding tables. Previously to laying a page down upon a moulding table, care is taken to have it clean, and completely free from any thing which might hinder the page from lying quite flat. Any small gritty particles, lying upon the moulding table, would push up the types they might happen to get under; and on that account, if a plate is cast from a mould taken from such a page, it must either be entirely rejected, or the letters which stand above the proper level of the page must be cut out, and the plate repaired in the manner detailed beneath, under the head "Repairing and Altering Plates." If, on the other hand, there be any thing on the moulding table to prevent the imposing chase and its furniture from lying flat, one of the following bad effects might take place, viz. 1st, supposing the page to be planed over, and forced a little lower than any part of the chase or furniture, then the plate cast from a mould taken in such case, would be of unequal thickness; 2ndly, supposing the chase, its furniture, and the types, to be relatively correct, yet, if there be any vacancy between them and the moulding table, some particular types might be pushed down by the operation of dabbing, and, consequently, being low in the plate, would either render that plate useless, or require it to be repaired in the way just alluded to.

"3rdly. Oiling the types is absolutely necessary; for, unless this be done, the gypsum will adhere very firmly to them; the mould will break in attempting to detach it from the types; the types will be filled up with the gypsum; it will be found exceedingly difficult to clean them; and, in cleaning, they will run great risk of injury. The application of the oil is a security against all this mischief; and, at the same time, it is laid on in so small a quantity as not to prevent, in any sensible degree, the mould receiving the perfect form of the types. The oiling of the types being resorted to for no other purpose than preventing the adhesion of the gypsum, the thinner it is applied, the better; and, with this view, sweet oil, or drippings of sweet oil, mixed with an equal quantity of spirits of turpentine, to render it very fluid, has been found most perfect and convenient for use. The brushes used for applying the oil to the types, are of that sort which painters call sash brushes; but large ones, and which are ground at the points, are picked out; they are chosen large, that they may oil the types quickly and thoroughly; and the grinding imparts to them these double properties; 1st, softness, whereby little or no injury is caused to the types in the operation of oiling; 2ndly, fineness to the points of the bristles, by which fine points the oil is applied to the minutest hollows of the types. Very little oil should be used; it is only necessary to take care that no part of the page is omitted to be oiled. Besides drawing the brush along and across the page, it should, for further certainty, be dabbed both perpendicularly and in a sloping direction. Observe that the oil and brushes just spoken of are for the types only; and that other oil, and other brushes, are made use of for the moulding-frames, as follows:

"When the types are oiled, the brush that was used for that purpose is hung up over the vessel which contains the oil.

"4thly. The lower and upper moulding-frames. The lower one is cut flat, both on the upper and under side, and is gauged throughout to an equal thickness. It has two steady pins, one at each end, which fit into the ears at the ends of the imposing chase, and serve as guides to raise the mould without any irregular motion. The separation of the mould from the types is effected by gently turning, alternately, each of the three screws, which are buried within the thickness of the frame, when it is lying upon the chase, and has the upper frame upon it. These screws have no heads, their threads being cut their whole length—there is a notch in each for the screw-driver to turn them; they have each a small round hole in the centre; and the screw-driver has a corresponding point, to keep it from rubbing against, and thereby injuring the screw threads which are in the frame. The lower moulding-frame determines the thickness, the length, and the breadth of the mould, as the mould is actually formed within it. The sides of the moulding-frame slope inwards, at an angle of degrees; and consequently, when the frame is raised by the turning of the three screws, the mould is lifted from the page at the same time. The upper moulding-frame is only cut flat on one side, to make it lie close upon the lower one. The dimensions of the upper frame are the same as the lower, and its sides are also formed to the like angle of degrees; but its slope is outward, as the widest side of its opening is put to correspond with the widest side of the opening of the lower frame. The upper frame is only made use of to avoid the scattering and loss of gypsum by dabbing, and is therefore removed as soon as the gypsum acquires such a consistency as to enable the workman to proceed to the smoothing of the back of the mould. The moulding-frames are oiled with drippings of sweet oil, without any mixture of turpentine, and the oil is applied upon them with a hard unground sash-brush. As it is of considerable consequence that the mould should fall easily out of the moulding-frame, its inner sides should be particularly well oiled; this is not so essentially necessary upon other parts of it."—*Stanhope Manuscript.*

OBSERVATION III.

I have before alluded to an alteration in the moulding-frame which varies it from the foregoing description. That which I have adopted is shewn in the engraving. It must be somewhat larger than the pages it is to be used for, so as to admit about a quarter of an inch margin of mould all round. It is of cast-iron (a pattern in wood, must, of course, be first made to cast from) about three-quarters of an inch square, bevelled on the inside, and having circular projections at each corner, drilled and tapped to receive screw-pins to serve as feet. As this frame determines, not only the strength of the mould, but the substance and regular thickness of the plate to be cast; it is of the utmost importance that the greatest accuracy should be observed in its construction. To effect this, I have mine turned on both sides by the same machinery which is used for turning entire surfaces of cast-iron. The legs, as said before, screw into the circular projections at the corners. They have each a groove to receive the turn-screw. Upon the right management of these legs depends every thing most important in this part of the stereotyping progress. First, they must be turned and set so that the frame will stand perfectly parallel with the moulding-table, at any given distance. Secondly, that distance must be so arranged as to give, in the result, the chosen degree of thickness to the plates, which is regulated by this means alone—the higher the frame is elevated, by turning the screw legs out, the thinner will be the plate—the lower it is dropped, by screwing the legs further in, the thicker the plate.

But even this nicety of apparatus may be dispensed with if the wood furniture be made of such a thickness that the moulding-frame, when lying upon the furniture, will give the proper thickness for the mould and plate. In this case no screws, or legs, or turning are necessary. If the wood pattern be truly made, and the iron-casting be flat and perfect, every requisite is acquired. I, at first, went to the expense necessary for the arrangement above described, but have, for some time, wholly laid aside the legs and screws.

"5thly. Concerning the quantities and the proportions of gypsum and water, which are mixed up for moulding, it is proper to observe that these should be as uniformly the same as possible; for, though deviations may not seem at first to be of any material import, because the gypsum sets sufficiently firm with different proportions of water; yet, as it is found, that on account of such differences, there arise variations in the dimensions of the stereotype-plates, this cannot but be viewed as a cogent reason for circumspection. One object with printers who devote their attention to the execution of fine printing is, to have the lines of one page fall immediately on the back of the lines of the other page. Without stopping to ascertain whether this is requisite or not, it may just be remarked, that the stereotype art interposes no obstacle to the attainment of this object, when care is taken to mix up the gypsum and water uniformly in the same proportions. As the best burnt gypsum mixes up most conveniently in the proportion of seven parts of water to nine parts of gypsum, copper cups are made for measuring these proportions, formed upon that calculation. Thus, say that the cup for measuring the gypsum is made to contain nine gills; then the cup for measuring the water is made to contain seven gills. Now, each of these cups being subdivided by distinct marks, into halves, quarters, and eighths, the proportion is preserved in any quantity which is going to be mixed, either by filling each cup, or measuring, by each, at the half, the quarter, or any given number of eighths.

"6thly. The shaking tool now comes to be used. According to the degree of burning which the gypsum has received, the shaking will require to be continued a shorter or a longer space of time; if underburnt, it will allow too little time for shaking and for dabbing; if overburnt, the mixture will look thin; assume a gritty appearance, and will take a long time to set. But when, avoiding these two extremes, the gypsum has received the proper degree of burning, the shaking of the gypsum and water may be continued half a minute, and yet sufficient time will afterwards remain for dabbing before it sets. The shaking is performed quickly, the left hand being under the shaking tool, and the right hand upon its cover; and, with a view to effect the perfect mixture of the gypsum and water, the regularity of current in the shaking tool is interrupted by a few momentary stops in the course of shaking."—*Stanhope Manuscript.*

OBSERVATION IV.

"The shaking tool" is not an expression quite to my mind. The "mixing-pot" would be more appropriate. Mine is made of copper, with a lid to sink inside instead of going outside of the pot. The copper-smiths call it a salve-pot.

The dabbing brushes I have made in the manner of the patent penetrating hair brushes.

"7thly. The gypsum is not poured all at once upon the page; but, at first, only as much of it as will cover the page very thinly. This is done with a double view, both of much consequence; first, the air confined in the hollow parts of the types, which, if not expelled by dabbing, would occasion dots in the stereotype plate, has a more free passage through the thin body of gypsum, than it would have, if the whole of the gypsum were poured on at once; and, secondly, the gypsum is not so much scattered about as it would be, if the dabbing were to take place through the whole body of the gypsum that is to form the mould.

"8thly. Dabbing is adopted solely for the purpose of extricating the confined air; the brush is held perpendicularly, so as to touch with the whole of it at once; and the dabbing is continued as long as the thin state of the gypsum will allow. The hair of the dabbing brush is only about three eighths of an inch long, made thus short, to give the hairs sufficient strength to reach into the fine hollows and divisions between the types.

"9thly. As soon as the workman has finished the dabbing, and poured upon the page the gypsum which he had left in the shaking tool, he must clean out the gypsum adhering to the inside of the shaking tool, by putting clean water into it two or three different times, and agitating it violently. The dabbing brush must also be immediately attended to, else the gypsum would set in so firm a body between the hair, as greatly to injure the brush, if cleaned in that state. The dabbing brush is cleaned by rubbing it with the hand, either when immersed in water, or when held under water running from a cock.

"10thly. The pallet knife is a very useful tool; it serves to collect any loose gypsum, and to return it for use to the back of the mould; it serves to give a general level to the back of the mould, when the gypsum lies thicker on some places than on others; and it likewise serves to clean the imposing chase and moulding-frames from any adhering gypsum and oil, after they have been used.

"11thly. *The straight edge.*—By means of this tool, a flat back is given to the gypsum mould. Its flat edge is made a little hollow, and serves to give a preparatory flatness to the back, leaving it a little too high, that a thin body of gypsum may be cut off by the knife-edge of the tool, when the gypsum is well set, and cuts firmly. If the cutting-edge of this tool be not kept truly straight, a different thickness in different parts of the same plate might be the consequence; for instance, suppose the back of the mould to be cut hollow towards the middle, then the stereotype-plate would prove thickest in that place; because the pressure of the metal is such as to force the back of the mould strongly against the cover of the casting-pot, and the mould will bend somewhat to this pressure, or break.

"12thly. In adverting to the time necessary for the setting of the gypsum, it is to be observed, that unless the proper degree of burning, which the gypsum requires, be scrupulously bestowed, the time of setting will vary; but if the gypsum has been properly burnt, it will be found to have acquired great firmness, and may be detached from the types, at ten minutes after the gypsum and water have been mixed together. A good way of examining the firmness of the gypsum, is to put the point of the pallet knife a little way into the mould, and observe the resistance it makes to the spring of the knife. This method will always be found a sure guide, and probably the best, for the workman to proceed to.

" 13thly. The raising or separating the mould from the page is accomplished in a neat and correct manner, by means of two steady pins at the end of the moulding-frame, fitting into the ears of the imposing chase, and of three screws, which are sunk within the thickness of the moulding-frame. The screws are turned alternately; and, at first, neither of them is turned more than one eighth part of a round, increasing by degrees, so as to raise the mould perpendicularly, and separate the whole surface of it from the types at the same time. The beauty and perfection of a plate are much promoted by carefully raising the mould from the types; as this care prevents the gypsum from breaking in the quadrat lines, or between rule lines; and, generally speaking, in the fine interstices between the types, where the mould, from being fine, is consequently weak. A good workman, who oils the pages well, and carefully raises the mould, will have very little disfiguring of plates from the breaking in of the gypsum."—*Stanhope Manuscript*.

OBSERVATION V.

This mode of raising the mould is found too slow and complicated. It also depends upon the peculiar correspondence of the moulding-frame with the chases and furniture already proposed to be dispensed with in Observation I. The mode now adopted in this operation is the application of two levers, as chisels, or irons with claws, which the workman uses by resting the ends upon the chase, and elevating the centre against the edge of the frame, which he, at the same time, keeps steady, to move the mould as directly upwards as possible, with the finger and thumb of each hand. This raising of the mould certainly requires much care and dexterity, which, if not nicely performed, will occasion parts of the composition to be left on the face of the letter.

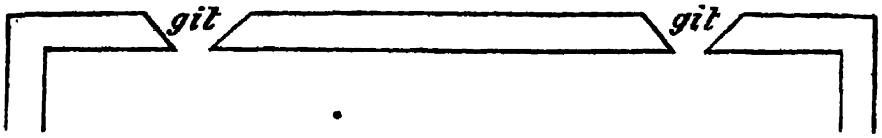
The furniture, also, must be so contrived that the legs of the frame may rest upon the table, either outside or inside the chase, with the centre of the page as near the centre of the frame as it can conveniently be brought.

"14thly. The mould being raised from the page, the workman places the moulding-frame, with the mould in it, and the face of the mould upwards, upon a plane piece of wood prepared for the purpose, there being fixed upon this piece of wood two thin slips of metal, upon which the moulding-frame is supported, and thereby leaving a vacancy all along under the mould. Having so placed the moulding-frame, the workman puts one hand upon it to hold it steady, and gives one, two, or more smart blows with a mallet under the projecting ear of the frame, which blows cause the mould to fall out of the frame upon the flat piece of wood. As the oiling of the moulding-frame is on purpose to prevent the gypsum from adhering firmly to it, if the oiling be imperfectly performed, there is great risk of the mould being broken, or at least partially cracked, by adhering more in some places than in others, and by too many blows of the mallet being required to detach it from the moulding frame."—*Stanhope Manuscript*.

OBSERVATION VI.

There is no occasion for these preparations of wood and metal upon which to lay the frame to knock out the mould. The workman will turn the frame on his hand, resting it, perhaps, against his breast, and will detach the mould with two or three blows of his hammer, receiving it upon his left hand; then laying down his hammer, he will take the frame in his right hand, and having disposed of that, he has both hands at liberty to manage his mould.

"15thly. The mould now only requires a little degree of dressing, to make it fit for being put into the oven to be dried, and afterwards cast. This dressing is confined solely to the removing of any high parts of gypsum upon the edges which surround the face of the mould, and which high parts can only arise from a want of truth in the imposing furniture, or from an injury which it may have received. These high places are cut off by the pallet knife, the workman taking care not to cut away any gypsum from the outer part of the edges, which part of the mould, from the nature of the furniture, must always be correctly taken. If furniture has been used, which does not of itself form gits to the mould, for the admission of the metal, the workman may easily cut gits* at each end, with the pallet knife, of this shape."



"16thly. The mould being now completed, it may either be immediately put into the oven, or laid aside till wanted for that purpose. If it be laid aside, the precaution of placing it upon a flat surface is necessary, to avoid any warping of the moulds. I have used a thick marble slab, made truly flat; and the moulds, as taken, are piled upon each other, with their faces downward to prevent their getting dust, or any thing else which might prove injurious to their faces."—*Stanhope Manuscript.*

OBSERVATION VII.

The Oven for baking the Moulds.—It is much to be regretted that the Stanhope Manuscript has left this article in a very defective state. It contains bare references to the laboratory at Chevening, and to drawings which his lordship intended to have made of this as well as of every other part of the apparatus: but as the references would have been totally useless without the drawings to which they apply, I have therefore omitted them. Neither the size, nor shape proper for the oven is prescribed. If made on purpose, perhaps two feet long, eighteen inches high, and thirteen inches deep, would answer every common routine of work for the foundry so far described. It may be divided by two shelves into three compartments—the undermost about four-and-a-half inches, for heating the casting-pots previous to immersion—the middle one eight inches, for quarto-sized moulds—the upper one five-and-half inches, for smaller work, Drying-racks must also be provided, similar to toast-racks, made of stout wire to hold the moulds upright in the oven.

"The number of moulds to be put in at once must, of course, be regulated according to the total number to be cast within a given time. Six or eight will get dry enough for casting by an hour's heating; and it is convenient that the moulds nearest the sides of the oven are somewhat sooner ready for casting than the moulds placed towards the middle of the rack. As the heat of the ovens is regulated by keeping it so as to melt tin in the upper one, that must be referred to frequently, on purpose to be safe in not getting these too hot, which should be avoided, for this additional reason, that moulds bend if exposed to too great heat. The stereotype workman may soon be able to know, by the colour of the moulds, when they are fit for casting; for, at that time, their type surface puts on the brown appearance of toasted bread.

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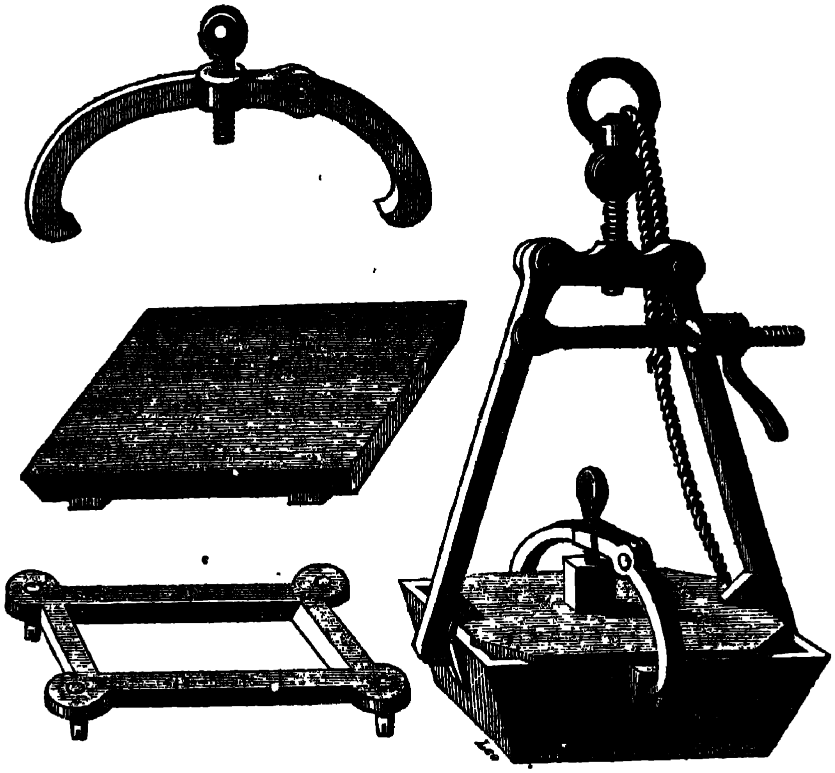
* This should be "*geat*, the hole through which the metal runs into the mould."—See Moxon, p. 53.

"At the time when the moulds are put into the oven, it is the stereotype workman's business, also, to light the fire under the type metal pit, in order that the metal may be in its proper state for casting, as soon as the moulds are sufficiently dry, which, as we have observed before, will be in about an hour's time. The metal must be brought to such a heat as to light a piece of brown paper when held in it, and, consequently, kept at this heat during the whole time of casting. If the metal be not sufficiently hot, the plates cast in it will be deficient in that sharpness wherein consists the principal beauty of a stereotype plate; attention to the fires, therefore, both of the ovens and of the metal-pit is at this time very requisite."—*Stanhope Manuscript.*

OBSERVATION VIII.

The Process of Casting now commences, the chief apparatus for which is—first, the casting-pot to contain the mould; secondly, its floating plate; thirdly, its cover; also the nippers; a contrivance to fasten down the cover by a screw, which can be so fixed as not to be immersed along with the box into the fluid metal, and which may be easily disengaged for succeeding boxes, while the first are gradually cooling; and, fourthly, a pair of hooks, or shackles, or a rack and pinion to be attached to the crane, which may be quickly fixed or unfixed without the workman being in danger of burning his hands.

The casting-pot must be of a size proportioned to the plates which are to be cast in it; for, if it be large enough, although no exact fit is necessary, yet much excess of size will be attended with inconvenience. Its shape is clearly shown in the engraving. It is required to be of cast-iron, and to be made with four ears, or



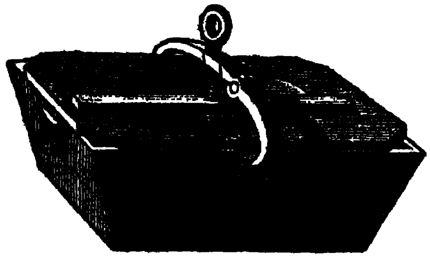
hollow square projections—two for the nippers, and two for the shackles. The cover is cast, also, with a rabbet to fit, but cut off at the four angles to admit the metal; and having a projecting piece in the centre, upon which acts the screw of the nippers. The floating plate, also of cast-iron, fits to the bottom of the pot. The nippers are distinctly shown at the top of the engraving. They have a hook or claw at each extremity to fit into the ear of the box; and a strong screw in the middle, with an eye at top, which, when put to use, is screwed on to the projecting top-piece of the lid, and has a hinge on one side, allowing it to be opened for being fixed, and for adapting it to various-sized pots. These two articles, last described, are separately shown over the moulding-frame. The face of the floating plate, and inside face of the lid, are turned with the greatest possible accuracy; for upon these depends the approach towards a true level of the back of the stereotype plate, as well as its equal thickness. The crane and shackles are for the purpose of swinging by a perfectly horizontal motion the casting-pot and mould into the liquid metal. The shackles are plainly shown in the drawing as fixed to operate. At the extremity of each arm is a kind of finger and thumb projection; the finger catching into the ear of the pot, while the thumb catches on the lid. A turn of the nut-handle upon the transverse bolt, near the top, fixes them in an instant; and the whole, as represented, is ready for immersion into the metal-pit. The mould having been previously placed in the pot face downwards on the floating plate, the whole is then suspended by the crane, which turns over the metal-pit, and lowered very gradually into the liquid, and there kept steady by the contrivance of a lever and weight resting upon the top of the shackle, or the same purpose may be effected by a rack and pinion fixed to the crane. The metal will then enter the box at the corners of the lid, causing a bubbling noise by the expulsion of the air, and by its gravity insinuating itself beneath the floating plate, which, being specifically lighter than type metal, the buoyant powers of the latter cause the plate and mould to float, so that the back of the mould is pressed against the lid of the pot, and the ledges of the gypsum mould are brought in contact with the floating plate, the metal, at the same time, insinuating itself by the geats into the part of the mould containing the type *en creux;* nothing remaining between the face of the floating plate and the inner face of the lid but the mould and the stereotyped plate. When the bubbling noise, above-mentioned, ceases, the pot is supposed to be completely filled; and if the metal has been at a proper degree of heat, which should be tried by the test before-mentioned, it will be ready to be taken out. Having remained immersed from six to ten minutes, it is drawn out by the crane with great care and steadiness, and swung carefully to the cooling-trough, into which it is gently lowered, and rested upon a stone or brick, or wet sand, so as to just touch the water, in order that the metal under the floating plate, at the bottom of the pot, may first begin cooling. The cooling is a most essential part of the process. Lord Stanhope, and with great reason, considered that it demanded the most minute attention; yet, in present practice, the shape of the casting-pot is much simplified from that which he recommends.

" The shape of the pot itself, having both ends considerably enlarged, is prescribed by what is found to take place in this method of casting; for it is essential, that as the metal shrinks in cooling, a provision be made to afford a supply thereof uniformly;

which is accomplished, by causing the stereotype plate to begin to set in the middle, and proceed progressively to each end. Heads of metal are therefore provided at each end for this purpose; and to be certain of having the metal longest in a fluid state, exactly opposite to the gits by which it flows into the mould, the pot is besides made to descend at the ends, thereby forming a sort of feet, and by the mass of metal securing a delay in the cooling of each end. In co-operation, and to attain perfect effect in this principle, the cover of the casting-pot is made hollow, so that the middle of it is an inch and a quarter lower than its ends; and it is only three sixteenths of an inch thick in substance over the back of the mould. This is truly a grand principle in the stereotype art, which ought, in no case, to be departed from; and which imperiously prescribes to the pot and its cover the shapes I have given them."—*Stanhope Manuscript.*

OBSERVATION IX.

In casting small plates, which are, usually cast by two at a time, this precaution of the hollow lid is not necessary; but for large octavos and quartos it cannot be dispensed with. In the act of cooling, the metal will contract, and for the first two or three minutes very rapidly. To supply for this effect, the workman will, perhaps, five or six times, take some metal in a ladle kept for the purpose, which he will pour in at the angles of the pot till he finds it set, and not capable of admitting more. The nature of the process is this—the metal having become expanded beyond its natural capacity by the application of powerful heat, contracts again as it cools, or recovers its natural temperature. It will have a tendency to cool first in those parts which are most exposed to the air, and which are consequently the corners of the plates; or, in those parts where the lid is of least substance to retain the heat. Hence, if the lid be thickest at the centre, it retains its heat there longer than at the thinner extremities; and the metal is thus kept fluid in the centre after it is set at the corners: consequently, the contraction, which would take place there last of all, could not be counteracted by the filling in at the corners, and the middle part of the plate must, in such case, remain defective. To remedy this, the hollow, recommended by Lord Stanhope, is absolutely necessary. Accordingly, I have the lids of my quarto pots cast



or turned hollow like a saucer, till, at the very centre, not more than a quarter of an inch in thickness is left; across which hollow I lay a bar of iron, upon which the point of the nippers rests. The engraving will make this perfectly clear. The hollow, when drawn out of the melting-pit, will contain some metal, which must be cleared off with a knife or any simple implement, and replaced by wet sand. This hollow in the lid I find completely reverses the process of cooling above described, so that I have no plates defective in the centres. Even if more rapidity of cooling be necessary, I obtain it by laying a little wet sand or gypsum in the hollow, which may also be done, if thought necessary, round the projecting part of the smaller lids.

The cooling-trough may be shortly described, although it must be evident that no determinate shape is necessary. It should, however, be sufficient in length to hold two or three pots—of depth sufficient to contain water enough to cool the pots, without the water becoming too hot. A long stone, about as wide as the bottom of the pots, should be elevated by bricks, so as to be within three inches of the top of the trough. The water must be barely level with the stone; and must be kept to that height, as it exhausts by evaporation, by a supply from the cistern.

The shackle having been disengaged and applied to another box, which had been in the mean time prepared with another mould, by the time the second or third box is in the trough, the nippers of the first may also be disengaged.

" If casting-pots are to be used a second or third time on the same day, the plates should be taken out of such pots, without waiting till they are very cold, as, by retaining some of their heat, they will be the sooner hot enough for next time of casting. To get the plate out, the nippers are first disengaged, and then the cover taken off; after which, the bottom of the pot is turned upwards, upon a very strong table [or block], above which it is lifted about 8 or 10 inches, and let fall from this height, and by repeating this several times, the mass contained in it is separated from the pot. The four corners of the type metal are then knocked off with a hammer, and the metal which surrounds the sides of the mould is forced away, after which separation, the mould, plate, and floating plate are easily got at. The floating plate is returned into the pot, its cover is put on, and it is again placed in the oven to heat; what gypsum can be readily detached from the stereotype plate, is taken away from it, and the plate is put into the water-trough to soften the remaining gypsum that it may be easily brushed off. The bristles of the brush used for this purpose should be no stronger than what is necessary to reach well to the depth of the beard of the letters; and the brushing should be effected with the plate either under water or held under a running cock; for an abundant supply of water contributes greatly to the plate being quickly and well cleaned.

" The operation of stereotyping is now completed; and when, by a proof of the stereotype plate, it is found to be faultless, the types of such page are returned to the compositor for distribution and further use."—*Stanhope Manuscript*

OBSERVATION X.

It will now be clearly understood, that upon, first, the truly plane surface of the floating plate; secondly, the equal thickness of the mould, by the accuracy of the moulding-frame; thirdly, the perfectly plane surface of the inside of the lid; fourthly, the perfect pressure of the nippers and shackles; and fifthly, the steadiness of the motion of the crane and pullies, will depend the degree of accuracy, and even substance, of the stereotype plate. The whole apparatus must float both in the air and the metal, and be rested in the trough perfectly parallel and horizontal. The mass of metal which has accumulated under, and will be attached to the floating plate, may be disengaged by a smart blow with a mallet. It will be proper to reserve this superfluous metal for the next melting, as throwing it immediately into the pit will cool the mass.

Notwithstanding the utmost care, and every possible success, still the plate will be found imperfect in a greater or lesser degree by dirt, or dross, or small globules of metal getting into the eye of the a, e, &c. it is, therefore, now turned over to *the picker*, who must possess the sharp eye and fine tools of an engraver to do his business effectually. Such minute, but serious, defects may be thus easily removed, as well as larger impurities occasioned by the mould not having been perfectly discharged out of the white-lines, space-lines, quadrats, or other lower parts. Some trimming will also be necessary, by means of planes, adapted to the purpose, about the ends and sides of the plate, particularly bevelling the flanch by means of which the plate is attached with brass slips or claws, or screws, or some similar contrivance, to the block which raises it to the height of type. Faulty, or wrong, letters or words can be repaired by punching out the part, and squaring with proper files so as to admit the letters to be inserted, which being brought to a level with the face of the plate, and the stem cut off to a level with the back of the plate, with a little solder and a hot iron, they may be secured and made as firm as the other parts of the plate. In some cases it may even be requisite to cut off a portion of the plate, and to substitute another part, which, having been previously cast, is joined on to the other by the soldering process. It has also been found a matter of great uncertainty, whether the plates, even with the most perfect apparatus, are all cast of equal thickness, and, consequently, a complete foundry must be provided with machinery for turning and dressing the backs of the plates. This is generally effected by a turning lathe, having an accurately turned chuck-plate fixed to the mandrel, with universal chucks or chops to embrace the plate, and a slide-tool, with carriage and cutter so accurately adjusted, that when the lathe is put in motion by the foot, the turning the handle of the slide-tool may cause the cutter to traverse longitudinally from the circumference to the centre of the chuck and back again, till, by the revolution of the plate upon the mandrel, against the point of the cutting-tool, a perfectly level and true surface is obtained in concentric circles upon the back of the stereotype plate. An apparatus of this sort will cost from fifty to one hundred guineas.

Many other tools will be found either necessary or convenient, concerning which, nothing but experience and circumstances can lay down rules; for instance, files, chisels, accurate straight-edges, lathe with circular saw, fine punches, piercers, a small press for proving the plates; tubs for the dross, waste plaster, &c. brushes; cloths with which to handle the hot boxes, metal, plates, &c. to enumerate and describe which would be an endless trouble; and to purchase them for the use of the foundry alone, no inconsiderable expense.

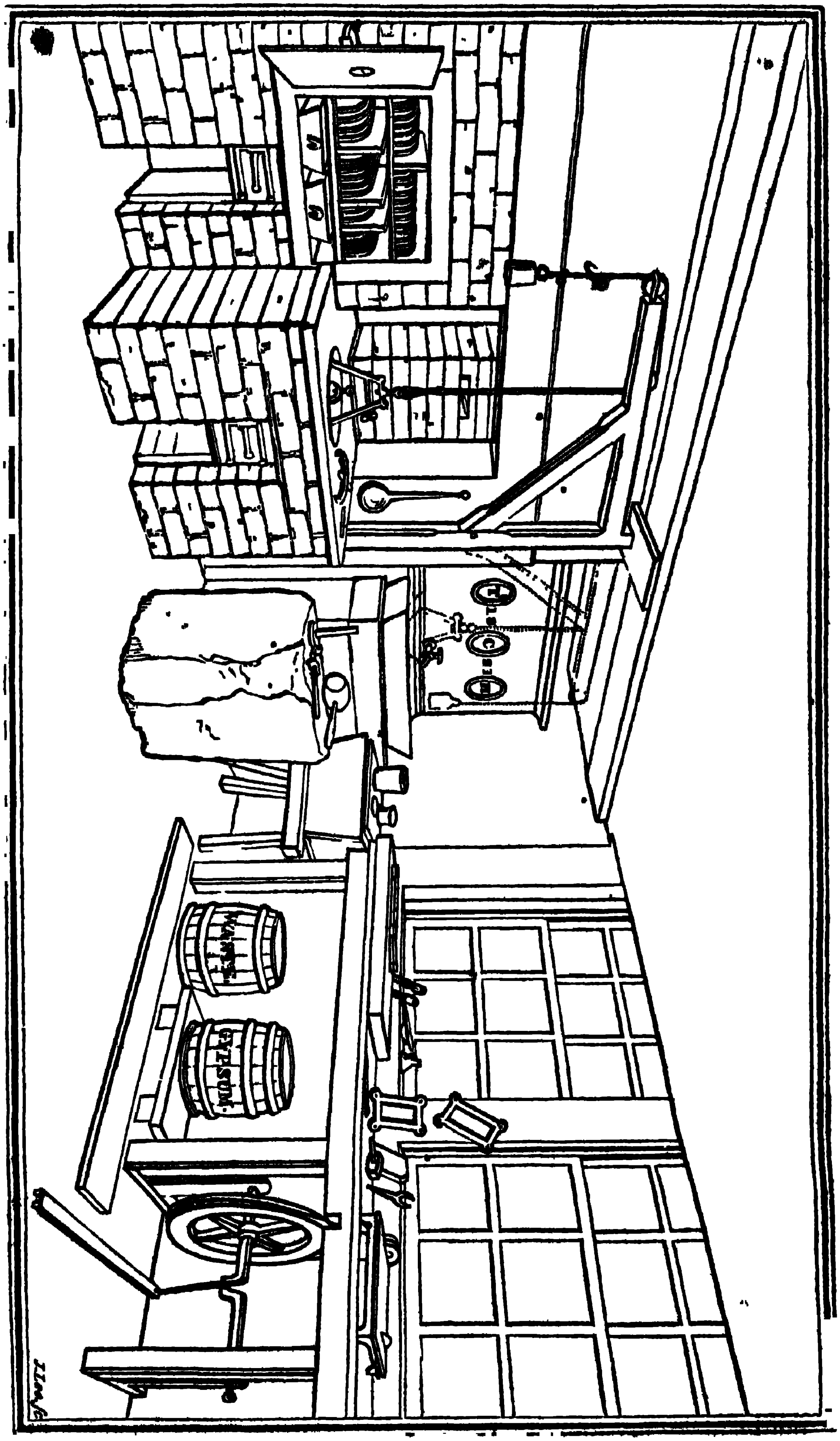
Making the metal.—The metal used for casting stereotype plates is as various in its mixture as the judgment and views of the operator. The considerations, however, by which he must be guided are these: If it be too hard the plates will be more liable to damage by the failure of delicate strokes in the face of the letters, which cannot be so easily rectified as where such defects happen to fusil types. If, on the contrary, it be too soft, the want of durability is a self-apparent consequence. Type metal is, in general, for the reason just stated, too hard; if used, it must, therefore, be lowered. But it is not to the interest of a printer to use type-metal, that is, old type, since in exchange for new type he will obtain a far greater value for it than it will cost him to prepare his own metal. If the metal is purposely compounded from the simple ingredients, one founder gives the proportions (but which do not appear very *precisely* defined) of from five to eight parts of lead to one of regulus, and one-fiftieth of block-tin. If genuine regulus, or unmixed with lead, can be obtained (but which is hard to be done), 1 cwt. regulus to 6 cwt. lead; or, in fractional numbers, $\frac{1}{7}$ regulus, and $\frac{6}{7}$ lead, will make a metal of excellent quality. I have paid five guineas per cwt. for regulus. The lead most preferable for this purpose is that usually denominated Tea-lead; or that which comes from China as the lining of tea-chests. This varies in price according to the market price of ordinary lead. I have given from 18*s.* to 24*s.* per cwt. This lead is very pure in itself, and is also enriched by a considerable quantity of very fine solder used for the numerous joinings. This must be first melted down and carefully skimmed of all ashes arising from the paper and dross, which will rise sufficiently to purify it by bringing the mass to a light crimson heat. Let it then be run into pigs, for which purpose I use casting-pots; and weighing each pig carefully, mark its weight, and put it into store till the metal is to be made.

The *making the metal* is a process requiring much attention and labour. The regulus, to assist its more ready fusion in the previously fused lead, must be first broken into very small pieces. A smart blow with a hammer while lying in the hand or on the floor will separate it readily the way of the grain. The metal while in the state of fusion must be constantly attended to, and stirred until the regulus and lead become intimately blended. The dross will require to be cleared off by throwing on small portions of oil or grease after the grosser parts have been skimmed off. Even these skimmings and ashes will contain considerable quantities of metal, and must, therefore, be laid aside for subsequent refining. The metal may then either be left in the pit to be re-melted for dipping, or run into pigs for store. Repeated fusion impoverishes the metal, so that if much residue be left in the pit after a day's casting, or if plates are melted down to be again cast into plates, the metal must be restored by an addition of new metal or of regulus. By way of assay either when making the new metal, or at any other time when you wish to ascertain its quality, you may run a ladle full into a mould roughly made of clay, or gypsum, or any other convenient substance, or even on a flat stone, so as to let it be of a moderate thickness; and letting it get cold, break it by a smart blow against the edge of the moulding-stone or table; if it breaks sharp, without bending, and shows a face perfectly uniform, and but the first degree towards sparkling, it will be good metal; if it appears too sharp, having your pigs of soft lead in store, the remedy is at hand. It is impossible by description alone to make any one acquainted with the precise hue necessary to be acquired; but the darker it is, the less rich is the metal.

It will readily occur to any one that the processes just described must be the most disagreeable and injurious to the workman, of any part of his business in the foundry. The running down of the tea-lead is particularly offensive; and the final mixture of the regulus the most injurious to his health. But this may be entirely avoided by judiciously planning the foundry: namely, by securing a draught of air from the other sides of the room to a flue nearly over the melting-pit, by which means the entire effluvia are forced *from* the workman to escape into the funnel of the chimney, and thence into the open air. In my little experimental foundry, a representation of which is here given, I have so well succeeded by leaving a portion of the large chimney between the smaller flues of the two furnaces, just at the back of the pit, open, with a window opening at each side, as to keep the place always wholesome, pleasant and cool. In fact, any one may be in my foundry during the worst parts of the process, without any inconvenience or injurious effects.

I must, however, confess, that I have found in this, as in many other branches of trade, that where considerable discretion and practical skill are requisite, and where a manufactory is established for one particular business, it is far better, and cheaper to purchase the relative articles ready made, than to attempt the embracing of every branch under one concern. This observation will apply very closely to that of smelting and compounding of metals; requiring furnaces and apparatus of far greater power than are requisite for stereotyping; besides that, the process, from the stench and danger of fire, ought never to be carried on in the midst of a populous neighbourhood. I am, moreover, well convinced, and again repeat, that even independent of the latter, and certainly important consideration, I have the metal ready made, to any required strength, much cheaper than it would cost me by being made at home. Mr. Mason, of Cornwall-road, Surry, has paid great attention to this branch of manufacture; and I have from him the metal, in pigs, ready for the foundry, made from foreign regulus and tea-lead, at about 40*s*. per cwt.; and my dross and sweepings refined for 14*s*. per cwt. on the product, which could not very well be done in a foundry at any expense.

It may be necessary here to observe, that I by no means intend to assume that either the foundry or the apparatus, as here shown and described, are in exact conformity with other stereotype foundries; or have any pretensions to superiority. But it is, altogether, what I find effectual for the intended purpose; and calculated to produce plates equal to any, and superior to most that have come into my hands. I converted a spare kitchen into a foundry, chiefly for experiment, and that I might be perfectly competent to say, that no part of this work has been written without a practical knowledge of every branch of the profession treated of. I had some standing work by me which I could practise upon, although with every inconvenience of low spaces, quadrats and leads. If I succeeded I might keep the plates and release my type: and if I found it agreeable to pursue the art still further, I might make my foundry a permanent addition to my business, and undertake work in this branch, for my own connexions, rather than let it go elsewhere.


WATER.
GYPSUM.

VARIOUS MODES OF STEREOTYPING.*

SECTION IV.

Various other modes of Stereotyping—The French—Hoffman's Process—Pingeron—Rochen—Carez foundation of an English Patent—Gengembre and Herhan—Efforts in the art, to form Assignats—Herhan's Process of striking the Mould in Semi-fluid Metal—His new method of composing Matrices instead of Types—Applegath and Cowper's New Patent for striking the Mould—Similarity to the Methods of Carez and Herhan—Mr. Brunel—His Patent for a New Mode of Stereotyping—Advantages—Not yet applied to Book-work—Very similar to Hoffman's.

In conformity with the plan adopted in this work, of describing the several methods used in every department of printing, with the variety of machinery either deemed the best, or most generally known and in practice, by which the different processes are effected; and then of briefly noticing the various methods and machines adopted by some, and proposed by others, I shall now shortly mention the several inventions and variations in the stereotype art attempted since the time of Van der Mey, Gedd, Tilloch, and Lord Stanhope. In these descriptions we shall find that the French possess, as usual, the numerical superiority on the score of variety; and that all those of our own country who have proposed methods essentially differing from that which is fairly designated THE STANHOPEAN METHOD, have borrowed their ideas, in great part at least, from what has been made public by the artists of that nation.

" The year 1784 is a memorable era in the history of stereotype and polytype printing, in France, as the attempts which were made in that year, in these arts, by François-Ignace-Joseph Hoffman, a native of Alsace, but residing at that time in France, excited the emulation of the artists of that nation, and produced an uninterrupted series of efforts, which, in the course of twenty years, brought the art of stereotype printing to that state of perfection in which it is now there practised. Availing himself of the then recent discoveries of Darcet, respecting the easy fusibility of certain alloys of bismuth,* Hoffman attempted to apply some of these to the formation of stereotype plates, by pressing them into moulds or matrices, the idea of forming which from pages of type he had taken from the previous essays of Gedd.

"He thus describes his process in a manuscript memoir, quoted by M. Camus—'With a page composed of types in the usual manner, he made an impression in a mass of soft fat earth, mixed with plaster (gypsum), and prepared with a glutinous paste of syrup of gum and potatoe starch. This impression became a matrice, into which a composition of lead, bismuth, and tin, being pressed at the moment of cooling, gave plates which exhibited, in relief, fac-similes of the types which had been used to form the matrice.'—In another part of the same memoir, it appears, that, before pouring the alloy into the clay matrices, he heated, in a stone, both them and the trowel with which he spread and pressed the alloy into them, in order to prevent a too rapid and unequal cooling of the metal. Instead of the composition above-mentioned, he sometimes used clay, mixed with Spanish white and Champagne chalk. The solid plate, which was the result of this process, when squared and properly adjusted, he fixed with pins upon a square block of walnut-tree wood."—Hodgson, p. 55—57.

M. Pingeron formed a composition of talc, gypsum, clay, tripoli, sand, &c. for the mould, into which he poured the type metal. He used, also, a sand-pit for the same purpose; and a composition of German spar, sal-ammoniac, &c. which would bear several castings before destroyed.

Another French artist, Rochen, proposed to set up a whole stereotyping establishment in the compass of a box, forming the appearance of a book! like Fraser's "much-admired Solanders," to contain pamphlets: or like our family draught and back-gammon boxes. The stock of types to be sufficient for four lines! the mould to be taken in gypsum with charcoal powder; and seven or eight pieces of this stereotype to be joined on one block, to form a page! These fooleries and burlesques soon gave way to some-

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"* Six parts of bismuth, four of tin, and three of lead, form an alloy, which becomes very soft at the heat of boiling water, and which may be kneaded, like wax, when half fluid; eight parts of bismuth, five of lead, and three of tin, form an alloy, which melts at a heat less than that of boiling water."

thing more substantial, and truly scientific. In 1787 Joseph Carez, printer, of Toul, in France, brought to some degree of perfection and utility, a process which he called *homotype*, or *many types in one*. This appears to me the more interesting, as having close affinity to a method for which a patent has been lately taken out in this country, and which will, in due order, be described; to prevent any imputation of prejudice on my part, I shall copy the description of Carez as given by Mr. Hodgson, from M. Camus. "The page, after being composed in the usual way, with moveable types, and carefully corrected, was inclosed in an iron chase, in which it was firmly held by screws. It was then attached, with the face downwards, to the underside of a block of oak wood, suspended from one arm of an iron lever, or swing beam (bascule). Upon the top of a wooden pillar, resting on the ground, and immediately underneath the page, there was placed a thin card or paste-board tray, rubbed over with oil. The workman then took from a furnace close at hand, a quantity of melted type metal, which he poured into the paste-board tray, and attentively watched its cooling. The moment that it began to be covered with a slight cloud, he let the block of wood and page fall upon it, and thus an impression, *en creux*, of the page was formed. The whole was then detached from the block; the page and the plate were separated, which was done very readily; and the plate was carefully examined. The workman then took off what was necessary, cut down the edges, and lastly, fixing this plate to the under side of the block, or *ram*, he let it fall upon some fused metal, placed, as before, on the sole of the machine, and thus obtained a plate, in relief, fit for printing with. This plate was then carefully examined and cleaned; its edges were cut off, sufficient being left at top and bottom to afford hold for a screw. The plate was then reduced by a plane to a determinate thickness, which was scarcely the twelfth of an inch below the nick of the letter. In this state, when wanted, it was attached by screws to a block of wood properly adjusted, and impressions taken from it in the usual manner" [pp. 66, 67.] It appears that M. Carez was eminently successful in his new process, and about 1786 and 1787 completed many works of magnitude, including a Dictionary and Bible, in close Nonpareil type. In 1792 Hoffman attempted a mode of producing stereotype plates, to avoid the expense of the composition of pages, and this with a stock of only 370 types! "Each of his types [some of which, by the by, were logotypes] was fixed in a block of copper, which, by its incisions and notches, furnished the means of placing it at a right angle upon the piece of clay intended to form the mould, and of sinking it perpendicularly, and to a precise depth, into it."

"A piece of clay [as described in p. 873] was pressed into a frame; a rule being fixed at the bottom of the first line, the knife or plane was slid along it, and the space of the line marked out. Each type was then sunk into the clay, care being taken to hold it against the rule in such a manner, that by means of the notch in which the rule fixed itself, the impression was always upright and of equal depth. The plate was then obtained from the mould in the manner of Carez"—[see preceding page]. But I feel that I should apologize to my professional readers for wasting time and paper in relating such ridiculous schemes.

"It does not appear that any works were ever executed according to this process; indeed" Mr. Hodgson very justly observes, "it is most probable that there never were any, for it must be evident to every one at all acquainted with printing, that it never could be successful. For independent of the extreme, and, I should think, insurmountable difficulties of sinking each letter into the mould exactly perpendicular, and neither too distant from, nor too near to its adjoining letters, and all of them to the same exactly determinate depth, the thickness of the thinnest possible piece of paper making a material difference in printing, it would be utterly impossible to preserve the square appearance of a page; for as the person who was forming the mould would never know, until he arrived at the end of a line, how many letters it would contain, he would be reduced to the necessity of either making improper divisions, or of leaving the lines of unequal lengths. And it may well be doubted, whether the labour and time required for the formation of such a mould, would not be infinitely greater than for the composition of a page."* No doubt can exist but that a compositor would beat the mould-stamper, five to one, unless it is to be reckoned that the mould-stamper must be infallible, then, indeed, as an establishment of *readers* would thus become an useless expenditure, they might each throw aside the pen, take a work in hand, and commence operation with 370 types, completing the work as they proceeded, saving proof-paper, correcting, author's labour (for of course no proof could be taken till the plate was cast), and every thing—excepting time!

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* Hodgson, p. 71-2.

Many experiments in stereotype, polytype, poly-plate, and every other kind of printing, were made by order of, or for the purposes of, the French government, during the period of the revolution, for supplying the requisite issue of assignats, and guarding, as much as possible, against forgery. Of these the most deserving of notice was that of Gengembre, afterwards engineer of the Mint; but as his experiments, in which he was joined, as partner, by his brother-in-law Herhan, relate more particularly to what was to be produced by *plate-engraving* and printing, it would be stepping over the line drawn for the subject of this work, to dilate upon them here; and they will, therefore, only be briefly recurred to when necessarily united with typographical printing.

Omitting, then, to recount the many processes by which it was attempted to form a paper currency, which should approach nearest in degree to the desired end of preventing forgery, I pass over to the period when the several scientific men directed their efforts to unite all parts of the note; namely, the letters, words, ornaments, &c. into one matrix, in order to form a stereotype plate which could be multiplied *ad infinitum,* not only imitative, but in perfect fac-simile, or identity, with each other. "These several parts being fitted together, forming one true and level face, were mounted upon a sole of copper or steel, and inclosed in a steel frame or box, the sides of which projected a little above the face of the matrix. A plate was then obtained from the matrix by means of the stereotyping, or striking machine, which was thus constructed and used: a table was firmly fixed, as high as the hand; and upon the back part of it, two pieces of wood, of a convenient height were erected, in such a manner as to leave a groove, or channel, between them. Between these two uprights, a mass of wood was made to ascend and descend, in the same manner as the ram of a pile-driving engine. In the under surface of the block of wood, and perpendicular to its axis, there was fixed a screw, which by fitting into a female screw, on the back part of the box, inclosing the matrix, attached it firmly to the block of wood, or ram. The face of the mould was thus turned downwards. The ram was raised by means of a winch and handle; and a tray of strong paper was placed upon the table, immediately below the same. Into this tray some melted type metal was then poured, and the sides of the paper alternately raised to cause the metal to flow from the edges towards the middle. When the metal was upon the point of becoming fixed, the pulling of a trigger disengaged the ram, which then slid down between the two uprights, and fell with all its weight upon the metal. The ram was afterwards raised, and the metal separated from the matrix with the blade of a knife; there was thus formed a plate, bearing in relief the imprint of the matrix. The frequent repetition of this operation produced the requisite number of plates, all perfectly identical. The plates were then dressed to a proper substance by means of a turning lathe, as described in page 867. In order to give a greater degree of pressure at the moment of striking, it was contrived to form a re-action of the table against the ram at the moment of *striking*. The feet of the table were fixed into boxes containing spiral springs; these being compressed by the fall of the ram, compressed in return, by their re-action, the still hot metal against the matrix."*

I may appear too prolix in describing this *striking* mode of stereotyping, by Herhan, as well as of that of Carez in a preceding page; but when the reader arrives at the knowledge of modern inventions he will be fully aware of my motives. In 1795, M. Gatteaux and M. Anfry practised another method of forming the mould or matrix; namely, by sinking the face of the original page of types into a plate of cold metal: but this required a previous arrangement, of rather too expensive a nature ever to become generally useful. The common type metal being too soft to bear this operation without considerable damage, a composition was formed in which some portion of silver was used; the type being cast (I should conceive with considerable difficulty) of this mixture, and a page set up and corrected, it was impressed, by means of a screw-press, into a plate of soft lead. M. Herhan improved upon this by inventing an alloy much less expensive; but it must be evident, that any mode of stereotyping requiring so much previous concert and arrangement, must ever be very confined in its utility or practice. In 1798 Messrs. Herhan and Didot, and M.

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* Hodgson, pp. 86, 89.

Gatteaux, obtained, individually, patents for new inventions in stereotype, and the two former entered into partnership in order to prosecute their inventions with united success, and published a long series of the classic authors, well known throughout Europe for their cheapness and neatness. Their mode was that of the metal matrix just above described, and *striking* with hot metal; but Herhan subsequently adopted a new process, the object of which was, "to form a set of types, or rather separate moveable matrices, each of which, instead of presenting a figure of the letter in *relief* and in *reverse*, should bear an impression of it, in right order, as when printed, sunk into its end, so that when the page should be composed with these types, it would become, without any other operation, one complete matrix, with which the plates, in *relief* and in reverse, could be *struck* as before described." To effect this, punches were cut in the usual way, on steel, but with a shoulder to prevent going beyond a given depth. A machine was constructed, by which the punch could be brought down perpendicularly upon the end of the piece of metal to form the matrix upon. Many experiments were made by alloys of different proportions with lead, to cast in a common type-mould the blank pieces of metal, which were afterwards to be struck with the punch. These failing in the requisite degree of hardness, he was obliged to form their shanks wholly from plates of fine copper, cut into rods, and by machinery drawn into the requisite thickness for the size and body of the various letters, and then cut into equal lengths, nicked as types, &c. Each piece was then singly fixed in the machine, struck with the proper punch, and formed the matrix. The spaces and quadrats were pieces standing much higher than the letter-pieces, and thus formed a deeper impression in the cast afterwards taken.

Thus every type wanting in a printing-office for this process of stereotype, must go through the separate manual operations of filing, dressing, arranging, striking with the punch, lining, and properly adjusting for the nicety of printing. It would appear in this country a labour for which no adequate remuneration ever could be expected. It is plain that the compositor's practice must be completely reversed—he must either compose and spell backwards; or begin at the right-hand end of his stick; or at the bottom of the page, instead of the top; or transpose every line after setting it. Proofs, it is evident, there could be none for the first stage of the work: a plate must evidently be first cast; then an impression taken; read; and the corrections made in the page of matrices; then cast again, &c. &c. till finally correct. It is scarcely possible to believe that such a process can be practised with any degree of success, but that the old, original mode of converting the whole type, as by Van der Mey, would be infinitely better, more expeditious, and less expensive, than M. Herhan's stereotype; yet M. Camus gives the description with every particular of authenticity; Mr. Hodgson expresses no disbelief of it; and to him I shall refer the reader, desirous of further information, for more lengthened details of the process, and specimen of work effected by it—see p. 101-111.

The last improvement upon Herhan's process which has come to my knowledge, is that by M. Porterat, who, to avoid the inconveniences I have mentioned in the preceding page, as affecting the processes of composing, proving, and reading, formed a set of types uniting the usual mode and that of M. Herhan, by having the letter in relief at one end, and the matrix or sunk letter at the other; the latter being of copper, the former of usual type metal, both united by soldering. Thus the compositor may proceed in the usual way, the lines be corrected, and then a plate struck from the reverse side; for the projector only proposes two lines at a time to be done, upon account, I should imagine, of the expense of the materials.*

In England a process of stereotyping, as far as relates to the moulding and casting, very different from the Stanhopean process, but very similar to the French, was, not long since, made the subject of a patent. This method consists in the formation, from the page of type, of a metallic mould or matrix, while the metal is in a semi-fluid state; and then, by fixing the mould in the place of the type-page, casting, or rather striking a plate in relief upon the metal in the same semi-fluid state. I am very credibly informed that this process was practised in Scotland several years ago; and it is, therefore, a fair presumption that the method possesses no superiority; or it would not now have been sufficiently novel to have formed the subject of a patent.

The process is described in the Specification as being effected by suspending the page of type, face downwards; and then having the metal, in a state of fusion, poured into a piece of dry cartridge paper loosely folded up as a box or trough, placed under the suspended type; and when the metal in this paper dish becomes cool, just on the point between '*fusion* and *fixity*,' it is struck, by the disengagement of a spring, by the type, and thus the impression is found *en creux;* and with some little trouble afterwards, the type is disengaged from the matrix. The back of the mould has then to be 'made true by turning, planing, or filing;' and then the plate is to be struck or cast by the same process, and its back to be turned, to make it true and parallel to the face.*

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* See Repertory of Arts, January 1820.

To form a judgment of the originality of this invention, I refer my reader to the description of the homotype process of M. Carez; also to those of M M. Gengembre and Herhan, which have been described in preceding pages. M. Carez appears to have practised the method of suspending the type-page, and striking the semi-fluid matrix, about thirty-one years previous to the patent of Mr. Applegath. I have not been able to ascertain the date of the practice of a similar method in Edinburgh, as mentioned in the preceding page, in order to dispute the originality of M. Carez' invention; but I should rather, from some circumstances, incline to the side of the French artist. At any rate, the English patentee can have no claim, except, perhaps, on account of the improved spring-ram, or drop, to an exclusive right to this mode of stereotyping; I, however, do not expect it will ever be thought worth contesting.

The latest invention brought forward in this art, in England, is that of Mr. Brunel, of Chelsea. His object, which is expedition in the process, was, at the time, solely adapted to the view [illegible] stereotyping daily newspapers, in order to set two or more printing machines to work instead of one; or to apply the columns of a newspaper to a cylindrical press, instead of an horizontal machine, and thus increase the rapidity of the produce. The invention consists, first, in a new mode of taking the moulds; and secondly, in a new mode of attaining the stereotype plate from such moulds. His process is, by pressing on the type the material which is to form the mould; for which purpose he proposes to make a composition of seven parts pipe-clay, twelve parts chalk or burnt clay, very finely powdered, and one part starch, making twenty equal parts in bulk, not weight. These ingredients, being incorporated with water and made into a paste, about the consistency of stiff putty, are to be spread over a steel plate, somewhat larger than the stereotype plate proposed to be cast; which steel plate is to be about the thickness of a saw-blade. The types being secured in a chase or galley, and the clay spread upon the thin plate of steel, as above described, a skin of parchment is then spread over the composition, and several thicknesses of thin calico (stretched in a light frame) over the types. The plate of steel, connected to the galley of types by hinges, is then, with its layer of clay, covered with the skin of wet parchment, turned over upon the types, and pressed or rubbed with sufficient force to spread or distribute the clay into the general form of the intended stereotype plate. The use of the skin of wet parchment and the coverings of calico is, to prevent immediate contact between the clay and the types while the clay is spreading or disposing itself over the mould-plate. After the general form of the proposed cast is thus produced, the coverings of parchment and calico are then removed, and two thin sheets of paper substituted in their place between the clay and the types. The process of turning the mould-plate with the clay on the types is again repeated, and the whole passed under a rolling press, by which the impression of the types is rendered more distinct. The two sheets of paper are then removed, and the type slightly brushed over with oil, the mould-plate is again turned down, and the last or finishing impression given to the mould: the clay and the types being this time brought into immediate contact, the impression of the mould is perfected. The flexibility of the mould-plate greatly facilitates the operation, and the thinner the mould-plate is rendered, the better. The mould-plate is placed in a tray of proper dimensions to form the plate, having an edge or rim about one inch high, the bottom of which tray is full of holes, for the purpose of admitting water to cool the mould when the hot metal is poured in to produce the cast. The metal to be used for the stereotype plate may be the same as usual; but when expedition is required, the well-known alloy of bismuth ten pounds, lead six pounds, and tin four pounds, may be used by heating it to about 400°. The mould-plate being laid in the tray, with the face upwards, a plate of cast-iron is placed upon it, raised, by adjusting screws, so as to regulate the required thickness of the stereotype plate about to be cast, and render it perfectly parallel. Things being thus disposed, the whole is to be heated to about 200° before the fused metal is introduced to the mould. When this is done, the metal is poured out, having insinuated itself into the mould and filled it up to the regulating plate; cold water is injected by a flexible pipe from a reservoir into the tray, which, coming in contact with the mould, cools the cast immediately. The superfluous edges of the cast are then broken off, the composition of clay, &c. washed from the stereotype cast, and the new-formed plate may be then considered as fit to be printed from.

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* The specification of the patent of Mr. Applegath may be found, with a plate, descriptive of the *spring-ram*, in the Repertory of Arts for Jan. 1820. Vol. XXXVI N. S, p. 69.

As it is requisite to have a great pressure upon the metal when the finest casts are made, it is proposed, under such circumstances, to place the tray with the mould, &c. heated as above, in a chamber which can be closed with a lid and luted so as to be air-tight; this chamber containing the mould may be exhausted, and then the fluid metal introduced by means of a tunnel and stop-cock to the mould, which fluid metal, when it has perfectly insinuated itself into the mould, may be acted upon or pressed by condensed air admitted into the chamber from a condenser attached thereto. In this situation cold water can also be injected into the tray for the purpose of cooling the cast as before described.

As the mould-plates, even after they have been dried, are sufficiently flexible to bend to any shape, it is proposed, if required, to cast plates shaped in segments of curves, or portions of cylinders, by attaching the moulds to the outsides of the corresponding cylinders, and placing them within other cylinders, so as to leave a parallel space between both for the fluid metal to flow in casting. It is to be observed, that these cylinders must be heated as above before casting is attempted.

A very expeditious mode of constructing a substitute for stereotype plates is also described, by spreading a coating of shell-lac upon a plate of iron, and hardening it by the fire until it is capable of receiving an impression; it is then dipped into the type metal and coated as if tinned, and then placed upon the mould as above made, and left there to cool under a press, which substitute is described as being remarkably perfect and stable; there are several modes of modifying the above plans, which are all claimed as parts of the above-recited invention for improvements in making stereotype plates—*Inrolled, July,* 1820.

It will be evident, that from the thin coating of the clay, or composition, spread upon the steel plate, and the gradual process of pressing this upon the face of the type to form the mould, that it will sink only the depth of the counter-sink of the face of the type, and very little below the depth of the shoulder of the type in the interstices left by the spaces, quadrats, space-lines, &c. so that no previous preparation of the founts to be used, such as square shoulders, high-spaces, quadrats, or leads, will be necessary in Mr. Brunel's process. There must be a saving, also, in the expense, and less dirt occasioned, than by the use of gypsum; and I should imagine, if it were worth the trouble, the composition, by grinding and mixing with water, might be used over and over again. The wear of the type also must be infinitely less than by any other process of forming the mould, since, except from the slight oiling before the last pressure, or the accidental adhesion of a piece of the wet thin paper, there will be nothing to clean off from the whole process. The breaks and picks also, unavoidable in the gypsum-moulding, will be wholly obviated; and even by the regular thickness which seems attainable by this process, the use of the lathe may, perhaps, be rendered unnecessary.

This invention has been so far effectual that I have seen a column moulded, cast, and fixed complete for working from, in 20 minutes; but the apparatus must be very expensive. How far it might be reduced if adapted only to book-work pages, I am unable to estimate precisely; but I should suppose it might be completed at as small an expense as the Stanhopean method, and I should think, in that case, it would merit a trial.

Here again the question of originality starts forward, and I must refer to what I have stated in a preceding page, [873] as the process of Hoffman in Paris, in the year 1804, which, in many respects, is exactly similar to that of Mr. Brunel—even the trowel described by the former is used by the latter.

WORKING THE PLATES.

SECTION V.

Of fixing Stereotype Plates for working—Nailing on Blocks of Wood—Lord Stanhope's Iron Blocks, with Ledges and Screws—Cement Blocks—Universal Plate, with moving Ledges—The Author's invention for this purpose.

The stereotype plates being completed by the hands of the picker, the next consideration will be the working them at press. It is first necessary to raise them, by some mechanical means, to the same height as type, which is effected by various methods. Lord Stanhope says, " It became necessary, in the progress of the art, to devise a method of fixing the plates upon the press with facility, and to enable the workmen to enlarge or diminish the margins as wanted. It is true, that former stereotypographers could not proceed without attending in some degree to this point. But they were content with the clumsy shift of nailing the plates upon blocks of wood; a method evidently very ill calculated for general use, when the art became more perfect, as the plates would unavoidably be exposed to great injury by the irregular warping of the wood. I have contrived iron blocks, which are cut to such a thickness, that a plate and a block together are exactly type height. There is an overhanging ledge upon each side of the block, the whole length of it, and cut to fit the sloping sides of the plate. One of these ledges is fixed; the other moveable, to admit of putting in and taking out the plate. In the moveable ledge there are three screws, by which the plate is held very flat and firmly. Different margins, to the different sizes of paper, are made by placing the blocks at a greater or less distance from each other."—*Stanhope Manuscript.*

Another mode has been practised, by laying the plate face downwards on the stone, and surrounding it with four straight pieces of iron of the exact height of moveable types, so as to form a mould precisely of the shape of the page, which being filled with a quantity of Roman cement, mixed to a proper consistence, the excess of the cement being struck off correctly level with the iron frame, it is obvious that the plate and cement together will form a plate similar to a page of moveable type. If there were no other objection it is evident, that the room requisite to deposit the pages of a work upon this plan would be an insurmountable one.

Another method of mounting stereotype pages is by nailing them to a board of the proper height. But the more mechanical method upon this principle is a plate of iron, with sliding ledges, for each page—a plan which has been adopted by some whose work lies chiefly in stereotype.

But neither of these methods is applicable to the convenience of a printing-office for general business. The expense of the first is very great, as every metal block must be turned in a lathe to procure a truly plane surface; and then it must be fitted up with the ledges and screws. The cheaper substitute has been blocks of wood, with brass ledges; but even these are expensive, and extremely liable, although made ever so fine in the first instance, to become afterwards defective; like the metal blocks, too, they can only serve for the same size of page for which they were originally made: and as the lowest expense of the cheapest of these contrivances is from ten to fifteen shillings a block, a printer must work many reams of paper before he can be repaid his expenses.

These considerations induced me to invent an apparatus for raising stereotype plates, which could be easily formed into pages of any size required for either the smallest or largest plate, and suitable to the ordinary mode of imposing; and which, although of little weight, would, from their construction, so effectually resist all pressure that could possibly be applied, that, supposing the plates made of one uniform thickness, no possibility would remain of one part ever printing fainter than another from any defect in the mounting; as is the usual case where wood (which will alternately expand or contract as more or less subjected to moisture) forms any material part of the apparatus. The expense of these is trifling when compared with that of procuring the metal, or wood-and-metal blocks commonly used; which, being necessarily provided for the various sizes of page occurring in the routine of business, must be of serious amount; particularly when of the best workmanship, and turned with any sufficient degree of accuracy.

The patent stereotype plate raisers, with the holdfasts or claws, may be thus described :—The raisers are made of metal, cast in a peculiar mould. They are formed with quadrilateral sides; first, to four Pica ms; then, of other larger figures—as four by eight; four by twelve; and four by sixteen : also of smaller ones, as four by two ; four by one; and four by a half. In height they are about three-fourths of an inch; or sufficient to raise the plate to the usual height, or somewhat higher than common type. These being cast and dressed perfectly true, both in body and height, admit of being easily combined to form the size of any page necessary, with the certainty of having a uniformly plane surface for all the plates, however numerous. The several pieces are cast hollow to prevent unnecessary weight; and the larger combinations have divisions to give sufficient support to every piece against any pressure which can be brought upon it.

The holdfasts, or claws, are formed of brass or tin, with a projecting bevil at the top, having the holdfast, or claw, in the middle, or towards each end. The height of the claw is sufficient for the projecting bevil to lie upon the flanch of the plate when resting on the raisers.

To prepare plates for working.—Form, with the raisers, the requisite number of pages for the forme or sheet, by the various combinations, and any difference that may be wanting in length or breadth make up by reglet, leads, or scale-board; then lay on the plates ; and at the side of each, place such holdfasts as may, from the size of the plate, be deemed sufficient for proper fastening; after which, proceed to make margin or dress the formes, and lock up in the usual mode.

To change the plates.—When worked, unlock the forme; slide off the done-with plate; replace by a new one; lock up again; and if the plates have been all cast truly to one gauge in thickness, width, and length, you will have, throughout the whole work, exact and uniform register, and equal impression. When the work is completed, the same raisers and holdfasts, by admitting of every necessary variety of combination, may be formed into any other sized pages for any other sized plates.

The cost of these raisers, sufficient for a sheet, is not so much as for a sheet of the ordinary metal blocks ; and the advantage which results is, that an office is at once provided with a stock sufficient to keep two presses constantly going of any sized work, without any additional expense; for if they have been used, for instance, for pages of octavo, a few minutes time will serve to convert them into pages of duodecimo—of octo-decimo, &c.—having a few over of each size to enable the various measures and lengths to be accommodated: and the metal is, at all times, worth a considerable portion of the original cost.

I must just mention, in this place, that a patent was taken out, in 1821, by Mr. James Fergusson, for "An Invention to make use of Elastic Substance in Stereotype-printing." This was accomplished by inserting cork, or other elastic substance between the plate and the block, or raiser, which should yield to the pressure upon the thicker parts of the plate, and at the same time afford the necessary resistance for obtaining sufficient strength of impression from the thinner part. But having thus noticed the patent, I shall say nothing further about it.

ON POLYAUTOGRAPHIC PRINTING,

OR

LITHOGRAPHY.

CHAPTER XVII.

Invention by Senefelder—His Work; published by Mr. Ackerman—Origin of the discovery—Lithographic Stone—Ink for Lithography, and method of inking it—Paper for transfer—Preparation of the Stone—Cylinders for inking the Stone—Paper for Lithographic Printing—Numerous causes of failure in the Drawing—Lithographic Presses—The Upright Lever, or Pole Press—The Bavarian Cylinder, or Star Press—Mr. Ruthven's Press—Various styles of Drawing applicable for Lithography—Advantages of Original Drawings on the Stone—General opinion upon public advantages of the Process, and how far Lithography and Typography are likely to affect one another—Comparison of Prices.

THIS mode of printing, by engraving or etching *in relief* upon stone, was brought into England about twenty years since. The inventor was Mr. Alois Senefelder, an actor at one of the theatres in Munich, the capital of Bavaria. In 1801, he made an assignment of his art to M. André, for the purpose of enabling him to take out a patent in this country; but it met with very little encouragement. Mr. Senefelder pursued his invention with ardour from that period, and in some places with success. The art was revived in London by the means of Mr. Ackerman of the Strand, who, in 1819, published in quarto, "*A Complete Course of Lithography, &c. by Alois Senefelder, Inventor of the Art of Lithography and Chemical Printing*;" and Mr. Hullmandel, who has practised the art in this country with the greatest success, has since published "A Manual of Lithography, translated from the French of M. Raucourt," and subsequently a more practical work, entitled "The Art of Drawing on Stone." From these works I shall endeavour to give a clear account of the general principles and practice of Lithography.

"Lithography," says Mr. Hullmandel, "is founded on mutual and chemical affinities, which hitherto had never been applied to the art of engraving. The Art may be divided into two parts; 1. The Execution of the Drawing; 2. The Printing. The former requires but little practice, as any person who understands drawing may meet with success; the latter is filled with difficulties; for no lithographic printer has hitherto been found, who can be quite certain of success in printing delicate and highly-finished drawings.*

"The first part consists in drawing on a stone, which has been previously made perfectly level and smooth, with an ink or chalk composed of greasy materials, in the same way as one would execute a drawing on paper with ink or common chalk; the second consists in taking the stone, as received from the draftsman's hands, and obtaining impressions from it, as one would from a copper-plate. To obtain these impressions, the lithographic printer wets the whole surface of the stone; but as the greasy chalk which constitutes the drawing, has a natural aversion for water, those parts of the stone alone which are not covered with the chalk imbibe it. The printer, while the stone is still wet, passes a thick and greasy ink over its whole surface, and the greasy lines of the drawing receive the ink, while the wet surface of the stone refuses to take it; a sheet of paper is now strongly pressed on the stone, which, receiving the printing-ink that has been applied to the drawing, gives a reversed fac-simile of the original one: the stone is wetted afresh, afresh charged with ink, and thus a series of impressions are obtained. In the above description consists the whole art of lithography.—The same result is obtained as in printing from copper-plate, but by different means: the process of engraving is entirely mechanical, that of lithography entirely chemical."†

Mr. Senefelder, in 1809, was appointed Inspector of the Royal Lithographic Establishment at Munich, with a salary of 1,500 florins (1*s.* 6*d.* each = £112 10*s.*), which he says, "has made his fortune; secured him from want the rest of his days; and placed him in such circumstances, that he need not look to his art alone as a means of subsistence."—Happy man!

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* Some specimens lately published show that Mr. Hullmandel himself can ensure all the desired success.

† Hullmandel, p. 1 and 2.

Some circumstances of authorship led him to "pass more than *one whole day* in a printing-office, and made him acquainted *with all the particulars of the process of printing:*"—the slight and hasty intuition of Mr. S. is certainly visible enough from some of the out-of-the-way projects into which he states himself to have been led—something like a traveller taking a rugged and round-about road to come sooner to his journey's end, when the *via trita* lay open before him. For instance, his plan of "engraving letters on steel and stamping them in formes of hard wood" (singly, of course), "and thus forming a sort of stereotype composition from which impressions could have been taken, in the same manner as from a wooden block," was not very likely to supersede the art of stereotyping to which he compares it, any more than was his "paste composition for taking the moulds," or "the sealing-wax and plaster-of-Paris composition, much harder than the type-metal of lead and antimony," with which the plates for printing were to be formed.

Notwithstanding these observations upon the folly of representing himself to have become acquainted with "all the particulars of the process of printing," by attending a day or two in a printing-office to superintend the progress of his publication (a play), it is not meant to deny to Mr. Senefelder all the praise he can desire for his perseverance and success in pursuing his invention, as well as for his candour in stating how far it may be usefully employed. It is frequently to be observed, that persons having new inventions or schemes to propose, cast a suspicion upon their projects by the excess of their sanguine proposals. I remember, when stereotyping was first established, the projector proposed to have companies and partnerships instituted, the members of which were to be share-holders according to certain regulations, and *every thing* was to be done by stereotype, even to the daily newspapers.

Not so with Mr. Senefelder. He says, "There is no invention in this sublunary world which unites in itself all the advantages and all the excellencies that might be wished. Lithography does not constitute an exception to this remark. It may, indeed, be said of the art of lithography, that neither type nor copper-plate printing can be dispensed with in consequence of its invention; though it is not impossible that, by farther improvement of the presses, it may one day combine the advantages of the other modes of printing with those peculiar to itself; but, at present, the facility and quickness of composition; the equality and correctness of the single letters, which can be obtained in type-printing, give to this art a decided superiority for many purposes. Some subjects, however, that hitherto have been executed by types, such as circulars; bills of exchange; invoices; cards; addresses, &c. can be executed by means of lithography more quickly, and in greater perfection, than by types."—" In both the ordinary methods of printing (namely, the letter-press and copper-plate) the charging the types or plates with colour, by which the impression is obtained, depends entirely upon mechanical principles, viz. that in the letter-press printing the colour adheres only to those places which come in contact with it; and, in the copper-plate printing, to those from which it is not wiped off."

" The chemical process of printing is totally different from both. Here it does not matter whether the lines be engraved or elevated; but the lines and points to be printed ought to be covered with a liquid to which the ink, consisting of a homogeneous substance, must adhere according to its chemical affinity and the laws of attraction; while, at the same time, all those places which are to remain blank must possess the quality of repelling the colour. These two conditions, of a purely chemical nature, are perfectly attained by the chemical process of printing; for common experience shows that all greasy substances, such as oil, butter, &c. or such as are easily soluble in oil, as wax, bitumen, &c. do not unite with any watery liquid without the intervention of a correcting medium; but that, on the contrary, they are inimical to the water, and seem to repel it. The principal dissolving and uniting liquid for the above-mentioned substances is alkali, which, by proper management forms a sort of soap soluble in water. Upon this experience rests the whole foundation of the new method of printing, which, in order to distinguish it from the mechanical methods, is justly called the chemical method; because, the reason why the ink, prepared of a sebaceous matter adheres only to the lines drawn on the plate, and is repelled from the rest of the wetted surface, depends entirely on the mutual chemical affinity, and not on mechanical contact alone."

Mr. Senefelder's first experiment only went to the application and use of the stone plates as a substitute for those of copper; but one of those trifling circumstances (to compare small things with great ones) to which many of the greatest discoveries and inventions are indebted for their origin, struck out at once a new prospect to his view, and by a series of patient experiments, enabled him to bring his object to the present degree of perfection. "I had," he says, "just succeeded in my little laboratory, in polishing a stone plate which I intended to cover with etching-ground, in order to continue my exercises in writing backwards, when my mother entered the room and desired me to write her a bill for the washer-woman who was waiting for the linen. I happened not to have the smallest slip of paper at hand, as my little stock of paper had been entirely exhausted by taking proof impressions from the stone; nor was there even a drop of ink in the ink-stand. As the matter would not admit of delay, and we had nobody in the house to send for a supply of the deficient materials, I resolved to write the list with my ink prepared with wax, soap, and lamp-black, on the stone which I had just polished, and from which I could copy it at leisure. Some time after this I was just going to wipe this writing from the stone, when the idea all at once struck me, to try what would be the effect of such a writing with my prepared ink, if I were to bite in the stone with aquafortis; and whether, perhaps, it might not be possible to apply printing-ink to it in the same way as to wood engravings, and to take impressions from it.

"I immediately hastened to put this idea in execution; surrounded the stone with a border of wax, and covered the surface of the stone to the height of two inches with a mixture of aquafortis and water, which I left standing on it; and on examining the effect of this experiment, I found the writing elevated above a tenth part of a line (or 1-120th part of an inch). Some of the finer, and not sufficiently distinct lines, had suffered, in some measure, but the greater part of the letters had not been damaged at all in their breadth, considering their elevation; so that I confidently hoped to obtain very clear impressions chiefly from printed characters, in which there are not many very fine strokes.

"I now proceeded to apply the printing-ink to the stone, for which purpose I first used a common printer's ball; but after some unsuccessful trials, I found that a thin piece of board covered with fine cloth answered the purpose perfectly, and communicated the ink in a more equal manner than any other material I had before used.* My further trials of this method greatly encouraged my perseverance. The application of the printing-ink was easier than in the other methods, and I could take impressions with a fourth part of the power that was requisite for an engraving, so that the stones were not at all liable to the damage of breaking; and what was of the greatest moment to me, this method of printing was an entirely new invention which had occurred to nobody before me. I could, therefore, hope to obtain a patent for it, or even some assistance from the government (Bavaria) which, in similar instances, had shown the greatest liberality in promoting and encouraging new inventions which I thought of less importance. Thus, the new art was invented, and I lost no time in making myself a perfect master of it."

The chief materials requisite in lithography, besides the press, are, first, the stone; secondly, the ink, composed of wax, soap, &c.; thirdly, the preparation for the stone, as, gum, aqua-fortis, or other strong acids; fourthly, the oil, varnish, and lamp-black. After an experience of twenty years, Mr. S. has not, in any of these fundamental principles, improved, altered, or newly-discovered any thing.

The Stone—found to answer for all the purposes of lithography better than any other yet discovered, is a sort of calcareous slate, pure, hard, and of a fine grain, imbibing both moisture and grease with equal avidity, on which principles the whole art of lithography is founded. It is procured in Bavaria, and particularly in the village of Solenhofen. In its chemical decomposition, it is found to consist chiefly of carbonate of lime: in nitric, muriatic, and other acids, it will almost entirely dissolve, and the carbonic acid escapes in the form of gas.

Stone of this species, or possessing the necessary qualities for lithography, was, for some time, considered as unobtainable from any other source,† and none has yet been discovered which unites the qualities of purity, whiteness, and hardness, equal to the Bavarian. At one time it was thought that a quarry, near Stratford-upon-Avon, produced a stone equal to the purpose; but this, called by geologists the *white lias,* is of so soft and porous a substance, as to be totally unfit for chalk drawings, or the finer applications of lithography; for the more ordinary purposes of transfers, and slight drawings, it may be an useful substitute. Another species, found in Warwickshire, called the *brown lias,* is so dark, when wetted, as to render the drawing almost imperceptible; neither of these species will split in so smooth and even a stratum as the German, and they therefore require so much labour to rub them down to a smooth and level surface, as to make them nearly as expensive, if not more so, since the repeal of the duty, as the foreign stone. For Ink drawings, *polished* stones of very fine grain are necessary, but for chalk drawings, a rough grain is indispensable.

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* He does not state by what means he communicated the ink equally by this process.

† From this opinion the Society for the Encouragement of Arts were induced to offer the following premium:—To the person who shall discover within Great Britain or Ireland, a quarry of stone fit for the purposes of lithography,

The best thickness of a stone for the purposes under consideration is from two to two-and-a-half inches. The size of its superficies must, of course, differ according to its intended use. It is split and rubbed down nearly to a level face at the quarry; and again dressed over with sand-stone, and pumice-stone and water, till it is proved to have a truly plane surface. The polishing is then continued with finer materials till judged perfect and fit for use.

The Ink—termed chemical ink, might, from the substances of which it is composed, be more properly named fat, or alkalic, ink It is used either for writing or drawing immediately on the stone; or for covering the surface of it like etching-ground; or for transferring drawings executed on the prepared paper to the stone. The peculiar qualities of it are, filling the pores of the stone in those places to which it is applied, with an oily, greasy substance; and that it will resist, at the same time, the action of the nitre and other acids. It is composed as follows:—

equal at least to the stones imported from abroad—the Gold Isis Medal, or Thirty Guineas.—A specimen of the stone, at least two feet square and two inches in thickness, with an account of the situation of the quarry, and certificates of its possessing considerable extent, to be produced to the Society on or before the last Tuesday in February, 1820.

Wax	by weight	12	parts.
Common Tallow		4	do.
Soap		4	do.
Lamp-black		1	do.
		21	

Other proportions are given, to vary the composition according to peculiar circumstances, in some of which shell-lac is added. These ingredients are put together into an iron saucepan, and exposed to a strong fire till the whole of the mass is in a state of ignition. When the quantity is reduced to one-half, the pan is carefully covered, or put into a vessel of water to extinguish the flame and cool the substance. When well mixed, and worked up till cool, it is formed into small cakes, cylinders, or sticks, and preserved for use, and may be applied in the form of a crayon pencil, or dissolved in the softest water to a proper degree of fluidity to write with a pen. The ink may be coloured to any variety, by substituting for the lamp-black, indigo, blue, lake, vermillion, red ochre, &c. so that none of the colours used contain neutral or other salts, which would alter the nature of the soap. The ink must be varied in its component parts according to the purpose to which it is to be applied. The above is given as the proper preparation for immediate application to the stone. For transferring drawings or writings from paper on to the stone, for hard or soft etching, &c. some variation in the ingredients is required; but wax, tallow, and soap form the principal. These must be regulated, in a great measure, by the finer or stronger lines of which the writing or drawing consists. Thus, for writing large characters, the ink must be more fluid than for small; or else, after drying, the strokes will have too much body, and be disposed to spread. This can only be regulated by the judgment and practice of the artist; since the temperature of the room, or even of the atmosphere, has a great influence in these particulars, and it is necessary to use a harder or softer ink accordingly. The paper also requires a particular preparation, in order to prevent the ink from running, and to induce it to transfer more clearly on to the stone. The paper is then wetted with a weak solution of nitric acid, and put on the stone which is previously rubbed down with water and pumice-stone, and then passed through the press. The whole is then placed in the vessel for biting in, containing a weak solution of the acid. This operation slightly corrodes the surface, and disposes it to imbibe either wet or grease with more avidity. The paper being disengaged, the stone undergoes the preparation with gum, as hereafter described, and it is ready for printing.

The Pens—and many other little utensils must be chosen and adapted by the experience of the operator, and according to the variety of his work. In many instances the steel pen is preferred; in others, the quill-pen of various degrees of hardness, various shapes of shoulder, and progression of nib. For some purposes port crayons and camel's hair brushes will be necessary. Indeed, upon the judicious adaptation and dexterity in using these and other similar utensils, suitable to the ink and subject, depends all the success of this species of printing; as, in fact, may be equally said of any other.

The printing-ink is laid on to the parts which are to appear in print by means of the cylinder or roller hereafter described. The wet parts of the stone refuse to take the ink, while the written parts, being greasy, have an affinity to, and take it freely. It will require several times rolling over, eight or ten perhaps; the paper is then laid on and the pressure applied. When taken off, the workman, with a sponge, washes the whole surface of the stone previous to inking.

In the ardour of his pursuit the inventor next proposes to transfer "all products of printing either with types or wooden blocks; and a newly-printed sheet can immediately be transferred to the stone, especially when the printer, instead of his common ink, has used the above-mentioned colour or ink." But he does not pretend to say that this ever has been done; and it does not appear very likely that, after the preparation of setting the types, reading, &c. of a forme of book-work, any printer or bookseller will prefer a transfer made to stone, to print twelve hundred per day, when a type-press can print three thousand.

I shall not take up the time of my readers with describing Mr. Senefelder's cautions against giving the printed (from type) sheet "too great a pressure, by which the types make impressions or small cavities in the paper," &c. and how to take them out again;

but shall proceed to such lithographic particulars as are more desirable to be known to the practical artist.

The preparation of the stone must be understood to relate not merely to the levelling, smoothing, and polishing; but also to imparting that quality to certain parts of the surface which will repel the colour where nothing is to appear in the printing. This is principally effected by the gum-arabic, or some other similar substance, which, by the previous use of the acid, the stone is rendered ready to admit; but neither the acids nor the gum can affect those parts which are already properly covered with the fat, greasy, or chemical ink: for "a few drops of gum-arabic dissolved in water, if applied to a well-polished stone, produce the effect, that the spot thus wetted will not take colour as long as it remains wet. As soon as it becomes dry the colour adheres to it, but is easily wiped off with a sponge and water. From this it appears that gum alone prepares the stone; or, in other words, imparts to it the quality of rejecting the colour or printing-ink. If, however, the acid has been previously applied to the stone, this quality gains in durability." But it must be frequently renewed, at least twice a day; or whenever the printer leaves off work to go to his meals; as the stone ought never to get dry.

The colour-cylinders or rollers used for charging the stones with ink are of wood, about four inches diameter, covered with flannel or woollen cloth rolled three or four times round, and then covered with calf's skin.

The paper used is of the same variety as for other printing; suited to the subject or price of the print or work. But it appears as if, in the case of works printed on both sides, as in music, writing, &c. much pains and expense will be necessary to prevent *setting-off;* as the inventor says, "a new sheet of blotting-paper ought to be used for every new impression." The previous preparation of wetting the paper depends on the same principle as for other kinds of press-work. The inventor acknowledges considerable difficulty in bringing off good impressions of any work where the excellence consists in a clearly-defined line. The drawing or writing looks better on the stone than impressions from it even on the finest paper. This he ascribes partly to the colour of the stone, which softens the whole by a half tint; and renders the drawing more delicate and pleasing to the eye. An impression taken on yellowish stone-like paper, greatly resembles the original drawn on the stone. The reason, he says, why impressions on white paper do not look so well is, that the colour *does not generally come equally off the whole surface.* The *possibility,* however, of effecting this, is well proved by *many perfect impressions.* Now, when it is considered that the perfect equality of colour over the whole surface of the impression constitutes the indispensable quality of even the most common letter-press printing, this recommendation of lithography, by its great friend, is not so very flattering as to give a high opinion of its excellence. The excessive price of paper in this country (four times that for which it is sold on the continent) will not allow of printing upon the *bare possibility* of having perfect impressions; and, from various hints throughout his book, Mr. S. makes it, indeed, a very remote chance of having many perfect impressions from a day's work upon stone. "If any part," says he,* "of the inked surface of the stone should be rubbed with the hand with a certain degree of pressure, the subsequent application of the roller and ink will not be sufficient to restore the impression. The drawing on the stone will seem to have suffered no alteration, and appears as black as in its original state, if cleaned and washed with water; but as soon as the roller is passed over it, the rubbed places reject the ink. In some instances this defect may be removed by the application of the proper means, but in others they prove ineffectual." Again, "It often happens that, through negligence, bad colour, or unclean linen rags, the stone is soiled, or takes colour in places where it ought not so to do, especially near the margins, as these dry most quickly, and are most exposed to the touch of the greasy hands or other accidents." In any of these cases, the only effectual way of restoring the design appears to be, to prepare the stone afresh: and even then, after all the pains of rubbing down the stone to a new face, and re-drawing or re-writing the surface, there seems only a chance of its being a complete remedy for the evil, so that a new stone might be deemed the most eligible cure.

The whole process of drawing on the stone appears, from Mr. Hullmandel's treatise, beset with difficulties and dangers of the most teasing and curious description; and is continually liable to failure from, apparently, the most trifling and even ludicrous causes: should any of the cuttings, or other loose particles, of the chalk fly on the stone, the mischief will be serious, if suffered to remain, or not removed with the greatest care: if paper be placed over part of the drawing upon which the hand might rest while engaged on the other part, the paper "takes up numberless microscopic particles of chalk from the dark touches of the drawing, and deposits them again on other parts of the stone, some of which are often intended to be bright lights; this, in the impressions, invariably produces a tint. Portions of chalk are also unavoidably lying on the face of the stone; these are taken up by the paper, to which, from the heat of the hand which is lying over it, they adhere very strongly; every time the paper is shifted, each little piece of chalk prints or marks a spot on the drawing; thus, every loose bit of chalk so adhering to the paper will print twenty and more spots."* A perspiring or moist finger touching the prepared part of the stone—blowing with the breath, coughing, or sneezing over the stone, would send small particles of spittle or saliva which would be unseen on the stone; but certain, even if wiped off ever so carefully, to produce white spots in the print. Also, "it is a safe precaution, whether the artist's hair be greasy or not, to wear a cap of some sort while drawing on the stone, as, if his hair should be scurfy, these small pellicles, imbibed with grease, will fall from the head on the stone, and form spots which do not show in the least until the drawing is printed, when they form multitudes of dark spots."† "Even a London winter atmosphere is unfavourable to lithography, as the smoke may fix in greasy particles upon the preparation of the stone, and cause a grey tint to be printed all over the impression."‡

The next subject to be treated upon will be the presses, by means of which the impressions are to be taken from the stones to the paper. In the course of experiments which have followed this invention, many kinds of lithographic presses have been devised, with various degrees of success; but these appear to have been resolved into two kinds of machinery, viz. the press in which the pressure is produced by *a scraper;*§ and the cylinder, or copper-plate press. The former, which the author denominates the *scraper-press,*§ and the *pole-press,*‖ appears that which is most suited to the work. The scraper " is a thin piece of hard wood, about an inch thick (usually pear-tree, plane, or box). The edge with which the pressure is produced is not thicker than the twelfth part of an inch; and by the action of the press it is violently pressed against the leather of the frame under which the printing paper lies upon the stone. In some presses the scraper is passed over the whole surface of the stone; or, it rests immoveable, and the stone passes under it, so that the pressure of the scraper successively acts upon the whole surface of the paper. In this sort of scraper-press, the impression is not, therefore, produced at once, and perpendicularly, as in the letter-press; but progressively, as in copper-plate printing; with this difference, however, that in the copper-plate printing-press a cylinder rolls over the stone, and in this press the stone is drawn under the scraper. The scraper acts with a very considerable power—sometimes of three tons and more—upon the leather frame placed over the paper; and it being necessary that, notwithstanding this heavy pressure, it should slide over the leather, it is evident that a great friction must take place; and though the leather is carefully strained over the printing-frame, and rendered as slippery as possible by grease, still it cannot fail to be considerably stretched by the passing of the rubber. This stretching is communicated in some measure to the paper under it, and effects a distortion in its parts by which all the lines of the drawing, in the direction in which the rubber passes over it, become a little thicker. If the leather is of good quality, well strained in its frame, and sufficiently greased; and if the soft paper under it be not too wet, the above-mentioned distortion is very inconsiderable; and in writing or larger drawings scarcely perceivable; but in very minute drawings, or in highly-finished chalk drawings, where the space, the single lines, or points are scarcely visible, the smallest extension or distortion of the paper is sufficient to fill them entirely, by which the impression is totally spoiled." [Various preventives and remedies against these disasters are then proposed.]

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* Hullmandel, p. 89. † p. 87. ‡ p. 11. § p. 181. ‖ p. 191.

Besides the effect of extending or distorting the paper, the rubber has another imperfection, viz. that of being easily injured, or even spoiled, if small hard bodies occur in the paper. In fine drawings of artists, which are commonly printed on very fine paper, this seldom happens; but in works where coarse printing paper is used, it very frequently occurs. If, in this manner, an inequality is produced on the edge of a stone, no subsequent impression can be perfect, as a certain line will be less printed than the rest all over the stone. As soon, therefore, as such a line is observed in the impressions, the scraper must be taken out and planed afresh; and be carefully adapted to the surface of the stone.

The cylinder of a copper-plate press approximates the nearest to this principle of pressure by acting on a single line of the plate at a time, and producing the impression, as the plate passes lengthwise through the cylinders, by a progressive motion over its surface. In letter-press work the power acts perpendicularly and simultaneously upon the whole surface of the type, &c. to be printed; each part of which receives only its proportionate share of that force or pressure. This surface does not fill, perhaps, one-fourth part of the sheet, the rest being so much below as to offer no resistance to the power applied. But it is otherwise in the stone; for, by the biting in, the interstices between the print are so triflingly depressed, that the entire surface offers a resistance. It would, therefore, be necessary to produce four times greater pressure in printing from stone than from type—a state of the question which shows the impossibility of a letter-press printer entering into lithographic printing by means of his own machinery. "By the most accurate calculations, a stone plate of the size of a common folio sheet* requires a pressure of from twenty-five to thirty tons to be printed horizontally; and such a pressure nothing but a very thick stone, placed carefully upon a horizontal foundation, is able to resist."

The only machinery which has been found effectual for lithographic printing is upon the principle already described of a scraper or line pressure, the most simple of which appears to be what Mr. Senefelder calls *the upright lever, or pole press;* which, he says, "is still in use in all establishments for printing all work which requires great dispatch; but the pressure cannot be raised to more than six hundred weight, without exposing the printer to an immoderate exertion; and for that reason it is not applicable to very large stones, or such as require a great pressure. For pen and ink drawings of the size of a common folio sheet,* it is excellent; and with two workmen twelve hundred impressions may be taken in one day."

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* This expression is not very clear to printers, as a sheet may be either folio, quarto, octavo, &c. without differing at all in its dimensions. Perhaps it may mean, according to the law-acceptation of the term, a sheet of foolscap or post.

In this press the pressure is produced by an upright lever from six to ten feet in length, to the under part of which the scraper is fixed; and the upper part is suspended from the spring of an elastic board. This board is fastened to a pedal, by which it can be depressed so as to act with its usual force when the scraper passes over the stone. The board fixed over the press must be so elastic as to spring at least one inch, as the scraper, in passing over the stone, describes a segment of a circle; hence the pressure at the two extremities of the stone is by no means so intense as in the middle. The stone is placed in a frame or box, and secured with wedges. This box has two frames which work on pivots or hinges, analogous to the tympans and frisket of printing-presses. The tympan, which is covered with leather, is brought under the action of the pole and scraper, which are united by a double-joint hinge, and which, when drawn to a straight line, and acted upon by the spring-board, preserve their perpendicular direction. The workman must press with his whole force against the table upon which the press stands, in order to get a firm hold, or he will scarcely be able to move the scraper. "In case of great power being required, the opposite workman, by pushing, may greatly assist the other."

Another kind of press, much used for lithography, is called the cylinder, or star-press, in which the box and stone move under the scraper which is fixed, and the impressive power is effected by a lever. But the principle upon which the impression is obtained is precisely the same as the former; and the star-press offers no recommendation of gaining even power; since, "if the pressure is not too strong, a single workman may draw the stone under the scraper; but in order to facilitate the operation, when the stones are large, and a stronger pressure is requisite, a corresponding star or cross is contrived on the other side, so that the other workman may give his assistance." And, in point of time, it is evident that a loss must be the consequence. These are the kind of presses now in general use in the lithographic establishments in France

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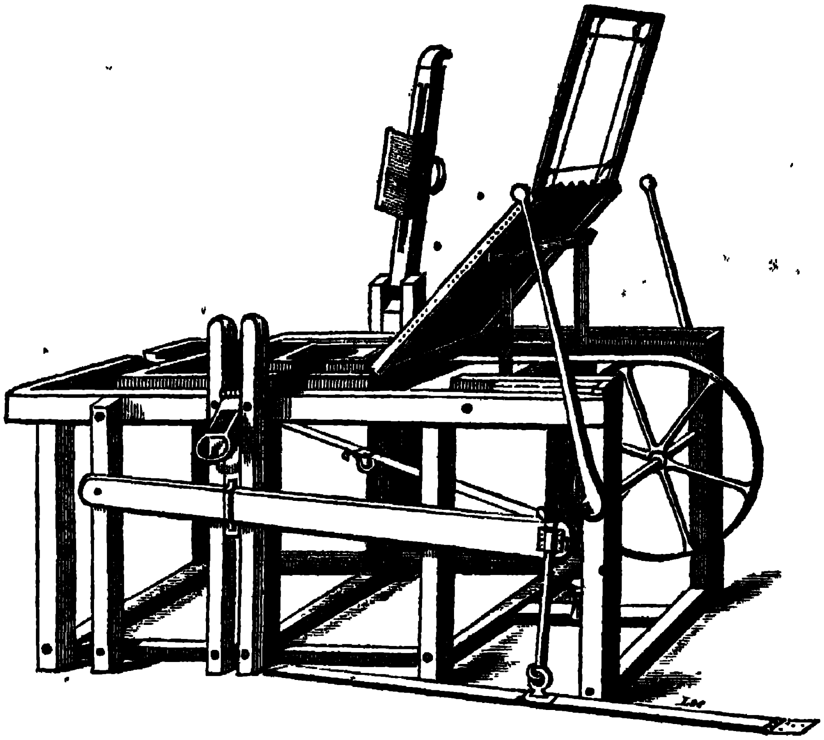
* See preceding note.



and Germany. That they should be used here must cause a painful sensation to any *mechanic* who witnessed the operation of lithographic printing. I have given a sketch of one of these machines, which I saw at work upon a quarto post letter, single page, and which, with the labour of two men to turn *the star*, could produce about fifteen hundred per day of what two men at a common printing-press would be ashamed if they did not do four thousand? However, the finest specimens of lithography in this country are yet produced from the star-press. Other presses are described, and one in particular, working by " a cylinder of brass eight inches in diameter," which is rolled over the stone in lieu of the scraper to produce the impression ; " but as this cylinder, though perfectly solid, would not produce the requisite pressure, two iron rods are attached to the pins, which pass through the table, and have cases filled with leaden or iron weights suspended to them; the space, however, seldom allows the application of more than five or six hundred weight, which, in most cases, does not produce a sufficient pressure for clear and perfect impressions. These presses would be greatly improved by being raised a little higher to gain more space underneath: or if the levers could be made to pass through the floor of the room, by which means space enough might be obtained to add a weight of two tons-and-a-half, or more, without fatiguing the workman too much in turning the cylinder." In order to improve upon this press the Bavarian mechanics might profitably inspect our old-fashioned linen mangles.

In this country, we have, as usual, been *improving* upon the foreign inventions. Mr. Ruthven has made lithographic presses by the application of the excellent plan of powerful pressure invented by him for type-printing-presses. The movement of, and pressure upon, the stone, is gained by two cylinders, in the same manner as our copper-plate presses; the power of pressure is regulated by his patent levers, acting upon the rollers by bringing them nearer to each other, as may be found necessary. However, in practice it is found that a cylinder is not sufficient, or effective, as it will not adapt the pressure to the inequalities of level which all stones are more or less liable to; wooden scrapers only will answer for good drawings, the cylinders, at best, for circular letters or maps. Still the Ruthven lever is retained to bring down the scraper, by which means the work has been rendered comparatively easy. Mr. Colby, of Shacklewell, has also invented a press for the same purpose, of great power, by very simple means, but he retains the cylindrical pressure.

The author has reserved to the latter part of his work his observations and detail concerning "*the transfer and tracing manner.*" —"This manner," he says, "is peculiar to the chemical printing; and I am strongly inclined to believe that it is the principal and most important part of my discovery. In order to multiply copies of your ideas, by printing, it is no longer necessary to learn to write in an inverted way; but every person who, with common ink, can write on paper, may do the same with chemical ink; and by the transfer of his writing to the stone it can be multiplied *ad infinitum.* At Munich, at Paris, and at St. Petersburgh, this manner is already used in the government offices. All resolutions, edicts, orders, &c. agreed to at the cabinet meetings, are written down on paper, by the secretary, with chemical ink; and in the space of an hour fifty impressions may be had. For circulars, and, in general, all such orders of government as must be rapidly distributed, an invention like this is of the utmost consequence; and I am convinced that before ten years shall elapse, all the European governments will be possessed of a lithographical establishment for transferring writing to the stone. In time of war this method is of the greatest use for the general staff of the army: it supplies entirely the want of a field printing-office; and admits of greater despatch and secresy. The commanding officer may write his orders with his own hand; and in his presence a number of impressions may be taken from them by a person who can neither write nor read. In commerce and trade, the transfer manner will, ere long, be generally introduced, especially in great commercial houses, where it often happens that a quick and accurate multiplication of price-lists, letters, and accounts, is of the utmost importance."

I agree with most of what is here stated respecting the utility of the transfer and tracing part of lithography. The Quarter-master-general's office at Whitehall has, for some years, had a lithographic establishment attached to it; and during the late war on the continent, our army was provided with the apparatus for the purpose of issuing orders, and communicating to the officers sketches of the plan of operations.

The liquid ink for writing on paper is made with gum-lac dissolved in lye of pure soda, with a little soap; and coloured with lamp-black. The chemical ink described by Senefelder for the purpose of transfer, is somewhat different from that used for writing or drawing immediately on the stone. It is formed of

Shell-lac	3 parts
Wax	1
Tallow	6
Mastic	5
Soap	4
Lamp-black	1

In a quarto volume of 342 pages, wholly occupied in describing the processes and materials of this one art, much interesting matter must be found which it would not have been possible to have given, in a specific manner, in the limits here set. The endeavour has, therefore, been to confine this abridgment to such particulars as will be found most valuable to those for whose peculiar use this work is designed. Even where any detail of the process, or description of the ingredients used, has been introduced, it has only been with a view of more clearly defining the general method. No one must, therefore, expect to become a maste of the art of lithography from what is here presented. Th "Manual of Lithography," translated from the French, by Mr. Hullmandel, as well as his subsequent work, "The Art of Drawing on Stone," gives the whole processes, failures, and remedies, more in detail; but these works only confirm my opinions already freely given; and will no doubt convince any reader that "those who really wish to study lithography, must be armed with courage and patience, and prepare themselves to exercise more than one art; it is true, that black, varnish, and printing-ink are to be found in the shops, but none of these are proper for lithography. All the materials necessary for this art cannot be employed in the state in which they are bought, some previous manipulation being always necessary. This is a natural consequence of the mystery which has hitherto enveloped lithography, and which has unti now hindered the Trade from furnishing the necessary ingredients. A lithographer is thus obliged to become stone-mason, carpenter shoe-maker, &c., and to prepare his own black, his varnish, an his ink, for nothing is indifferent in lithography; all must be don with care and intelligence; and often those things which, in thei manipulation, appear unimportant, are, in the end, of the utmo consequence."[*]

The art appears to admit of being applied to a variety of purposes; as, imitations of ink-drawings, either by lines or dots; etchings of engravings; chalk; wood-cuts, and aqua-tinta. The style, however, which has a decided superiority, is that of chalk, as no copper-plate engravings can give so perfect an imitation of original pencil, or crayon drawings. For all scenery, and subjects from nature, it offers also peculiar advantages: the original artist drawing his work upon the same surface from which it is to be transferred to the paper in any number of impressions required, it will exhibit throughout all the freedom and spirit of his pencil without losing by the transfer of the engraver to wax and copper; only, he must either draw in reverse, or the print will be in reverse of the original. However, from the natural tendency of the stone to imbibe the lithographic ink, it is impossible to obtain very fine lines, or delicate drawings, which might not be executed with more ease by etching on copper. Such drawings may, indeed, be produced by *engraving* upon stone; but as it requires almost as much practice as engraving upon copper, the chief advantage of lithography to the fine arts, viz. that of enabling an artist to execute his own drawings, is lost. The great bulk and weight of the stones are also a disadvantage which must ever tend to preclude a person from laying by the inscribed stones, as can be done so conveniently with engravings on copper plates.

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[*] Hullmandel, p. 4.

Transfers upon stones, however, with regard to writing, are extremely useful; and even the transfer of prints from copper-plate has been effected by Mr. Hullmandel with surprising success. It appears that lithography has been chiefly esteemed, both at Paris and Munich, for its application to chalk drawings, excepting its acknowledged utility in the transfer of writings.

Mr. Raucourt, as translated by Mr. Hullmandel, says,

"The extreme facility with which drawings are made upon stone, and their being, in fact, original, give a great advantage to lithography over engraving; but, on the other hand, it must be confessed that, in point of beauty and perfection, nothing has been hitherto produced to be compared with fine line-engraving" [p. 128]. However, in the mezzotinto style, drawings on stone appear capable of entering into competition with any engravings of the same description, upon copper. The work above-mentioned of Mr. Hullmandel "Art of Drawing on Stone" exhibits fine specimens, particularly a head of Rembrandt, and a landscape; and the lithographic works published by Mr. Ackermann, drawn by Mr. Hullmandel, as also by Messrs. Ward, Nicholson, Westall, Harding, &c. show what degree of perfection this new art may be capable of attaining, when fostered by British encouragement.

Various tints may be produced by using two or more stones, which, being covered with greasy composition, the lights are scraped out in the places where they are intended to appear on paper; and the print being brought on the stone in its exact place produces the effect of a drawing on coloured paper touched with white. These drawings may be printed with a third stone, to give more effect to fore-ground. Imitations of wood-cuts are produced by covering the stone with lithographic ink, and scraping out the intended lights; and as the finer touches may be added with a hair pencil, prints far superior to wood-cuts may be obtained. But the chief advantage of wood-cuts, viz. printing them along with the letter-press, is not attainable.

Engraving upon stone is performed by polishing the stone, and covering it with a thin coating of gum and black. The parts of the drawing must then be scraped out; and when finished they will of course appear white instead of black. The thicker lines, as in copper, must be cut somewhat deeper than the others, and when the drawing is complete the whole is rubbed with linseed-oil, which being resisted by the coating of gum, only touches the stone where that is scraped away. The gum is then washed off, and the print obtained as in the other style of printing. The imitations of aqua-tinta are produced by several stones coinciding with each other, and producing a succession of flat tints, as before-described. Drawings may also be done by mixing ink with chalk, and adding flat tints.*

In going thus far into the detail of this new mode of printing, I have been actuated by two motives:—first, that of giving general information relative to an art claiming some affinity to our own; and secondly, that of showing how far lithography will either interfere with, or be auxiliary to typography. Whether I have succeeded in the former motive it will be for others to decide; on the latter, I may venture an opinion, that it will be of no effect either the one way or the other.

I had, at one time, an intention of making a temporary carriage, on which we (printers) might work stones by the power of our presses; but a careful perusal of the works above referred to, and a personal attention to the process, have convinced me of the impracticability of such a scheme; or of any union of the two arts; nor have we any thing to apprehend from the success of lithography. Circular letters, and official orders, by the advantage which the method of transfer gives, are the only instances in which it will interfere with the ordinary mode of printing, and be likely to supersede, in any respect, letter-press work; and in these even, where economy is necessary, letter-press will have the preference. In cases, also, where the beautifully clear and distinct lines produced by the engraver on copper, and the type-founder, are objects of attention without the aid of extraneous ornaments and flourishings, the stone-printing will not be adopted. To compose types for transferring on to stone, and thus making stone pages, will be far more expensive than stereotype, and require twenty times the room to keep store, even if it could be brought to answer in other respects, so that its adoption in such a way is totally out of question; and few authors will write their works upon prepared paper for transferring them to stone, for the sake of exhibiting to their friends and posterity fac-similes of their manner of writing for the press.

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* See Mr. Hullmandel's paper upon Lithography in the thirty-seventh volume of Transactions of the Society of Arts, which accompanied several specimens of the different styles: particularly his Views in Italy.

As to any advantage gained by the public, on the side of expense, I shall show that to be very equivocal. The list of "prices at the Lithographic Press, No. 8 Pickett-street, Temple-Bar, in April 1822, is as follows: —

> "*Lithography Circulars* 4*s. per* 100 *pages, ex. paper.*
> *Ditto, Plans of Estates* 8*s. to* 21*s. per* 100, *ex. paper.*
> *Writing charged when less than* 300 *copies from* 1*s.* 6*d. to* *per page.*
> *Transfer ink* 1*s. per bottle—Transfer paper* 1*s. per sheet.*
> "N. B. Even hundreds always charged."

Now the question is, what would be charged by a letter-press printer for the same.

Letter-Press.				Lithography.					
250 ex. paper	£0	8	0	250 as 300	12	0			
				Writing	1	6=	0	13	6
500	0	11	0	500			1	0	0
750	0	14	0	750 as 800			1	12	0
1000	0	17	0	1000			2	0	0

And if the employer wishes to display his own hand-writing, there must be added, one shilling for the bottle of ink, and one shilling more for the sheet of transfer paper.

The side on which the advantage lies, with regard to plans of estates, is rather more difficult to be shown, because it is not easy to estimate the average expense of engraving. But it is certain that the plan must be drawn upon either the transfer paper or the stone; and in either case the artist must be paid. Then the printing would be from eight to twenty-one shillings per hundred, exclusive of paper. Now a plate, quarto size, may be worked for about three shillings per hundred; so that it does not appear, from these statements, that the public are likely to be advantaged by lithography on the score of price.

The commendations which I have just given to this art, might induce an opinion that it would very materially interfere with copper-plate engraving and printing; but there is one circumstance which will effectually protect those professions; namely, the slow, and consequently expensive, process of stone-printing; this, in long numbers, will counterbalance all the difference in value between engraving on copper and drawing on stone. A small quarto head will cost at least twelve shillings per hundred working. Thus, where very limited numbers are sufficient, all the advantages of the first artist's drawing being transferred to the paper at a less expense than its copy can be engraven on metal, may so far be obtained: but when the long numbers necessary for the usual impression of a work are required, copper-plate will have the decided advantage.

DECORATIVE PRINTING.

CHAPTER XVIII.

Revival by Mr. Savage—The Chiaro Oscuro—Colours by suites of blocks—Manner of Papillon—Mode of Printing—Paper Hangings—Chinese—Initial letter B of the Mentz Bible—New Mode of producing such a Specimen—Mr. Savage's Specimens—Requisites of the Artist—CUI BONO—Calculation of Cost—Failure of the Chef-d'œuvre—Pleasing relief on referring to the first principle of the art of Printing—Branston's Cave of Despair, reversed—India Paper.

THIS subject of fancy has been lately revived by the work of Mr. William Savage, a printer of acknowledged ingenuity and talent; but whose labours in this performance have been applied, I fear, more towards the honour of the art, than to his own emolument.

The principal view of Mr. Savage in compiling this work, appears to have been, to draw the attention of the British typographer to an art attempted many years ago, and which, most probably, was not then persevered in for the very same reason that will render futile the attempt to revive it in the present day, namely, its total inutility.

Mr. Savage divides the subject into two kinds of specimens; namely:—First, that of prints worked with different gradations of the same colour, which produces the effect of what is termed chiaro oscuro, or cameo. The first practiser of this method has been generally supposed to be Ugo da Carpa, an Italian engraver of the sixteenth century, who, with other contemporaries, produced the effect of chiaro oscuro drawings, by means of two, three, or more, blocks of wood printed with different gradations of the shade of the same colour, upon the same paper.*

Secondly, the printing a picture by suites of blocks, in various colours, " so as to give fac-similes of the productions of different masters, at a small expense, to serve as studies, or for the decoration of rooms, where, if framed and glazed, the eye should not be able to distinguish them from drawings."*

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* Ottley, vol. i. p. 34. *n.*

It appears to me that Mr. Savage may have first taken up his idea from the work I have before mentioned, viz. that of *Papillon*;† upon the appearance of the first part of Mr. S.'s work, I was instantly struck with the resemblance of his first specimen of chiaro oscuro, to one of Papillon's executed precisely on the same principle.

To produce these effects, as many blocks, designed and fitted *en suite*, are employed, as are the tints or colours which the artist intends to produce. The first of these is termed the *blotch block*, which is used to print the first or lightest tint, out of which the extreme lights, or whites, only are cut, or excavated; the second block prints the next tint, and so on until the whole design is completed; the number of blocks being determined by the degree of finish intended to be given to the print.

In forming prints of multifarious colours, a similar routine takes place, the various blocks being traced from, and all matched to, each other, inked with the requisite colours in proper succession, and united and blended by the most skilful and patient workmanship, and by means of those *sheet* anchors of pressmanship called points, three, or even four of which are fixed (by what a printer calls *paste-points*) upon the tympans, so as to act upon the margins of the print: thus, every block of which the suite consists will require separate beating, pointing, and pulling.‡

It appears, both from Papillon and Savage, that this mode of ornamental printing was practised by the earlier typographers:

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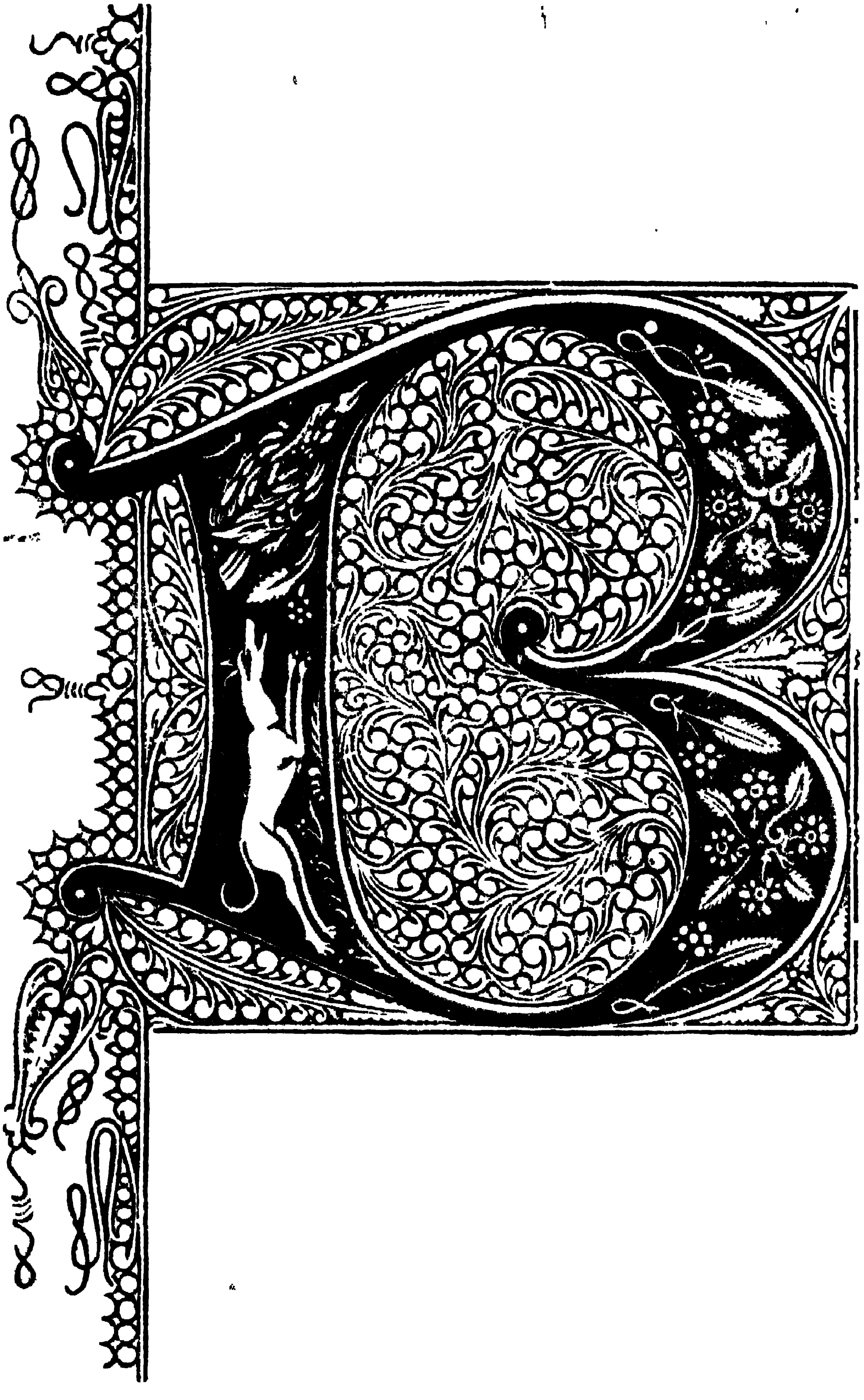
* Savage. † See pp. 18. 623.

‡ Perhaps it may be expected that I should instance, in the course of this chapter, the beautiful paper hangings for rooms, printed in various colours, from blocks, *en suite*, and sheets in series, first produced in Italy and France, and now *improved* in England. The principle is certainly similar, but as the purpose is different, and colours laid on in relief, any thing like a classification or comparison of the two species of printing would not be just. But here the sad rogues, the Chinese, are before us again.—"D—— the ancients," said the Irishman, "they are always *staleing* one's good thoughts." I happen to have a set of silk hangings, for a room, with figures printed in colours, and several portions, or sheets, to unite and form for a subject within a border, exactly upon the principle now under consideration, but falling to pieces from age.

To face page 913.



they both affirm the large ornamental capital letters of the Mentz Psalter (Faust and Schoeffer, 1457) as well as the Bible and other books, to have been *printed* in *colours* with *suites* of *blocks*. The former asserting that there were three colours used, viz. red, blue, and purple, the latter contending for two only, viz. blue and red. I have had no opportunity of examining any one of these treasures of typography. The letter B at the beginning of the volume has been, as I have before stated [p. 46], copied in fac-simile by several authors, and described by others; and I mean to give it in those [illegible]; both as an exemplification of the principle, and for the purpose of showing that it may be produced by a process certainly never yet called in aid of such a purpose, but which would save much time and expense of engraving suites of blocks; namely, stereotype; and, having one block only engraved, the rest may be effected by merely such hands as are on the ordinary establishment of a printing-office.

Mr. Savage, who examined a fine copy of this Psalter with the most anxious curiosity, says, "he could not help admiring the great accuracy with which the workmanship was executed, in inserting a large capital letter into the surrounding ornamental part, where the exact shape is bounded by a fine line of a different colour, so near to each other, as to be separated by a space not more than the thickness of writing paper, and uniformly true in every instance; but the general appearance of the work is heightened in beauty, by a more bright and delicate tint of each of those colours in other places written or painted in by hand, as well as some other emendations of even the black ink.

"It is a curious fact," says Mr. Savage "that under Fust and Gutenberg the process should be carried nearly to perfection; for some of the works they printed, both in the quality of the ink, and in the workmanship, are so excellent, that it would require all the skill of our best printers, even at the present day, to surpass them in all respects: and I do not hesitate to say, that in a few years after, the printers were actually superior to us in the use of red ink, both as to colour, and as to the inserting of a great number of single capital letters in their proper places in a sheet, with a degree of accuracy, and sharpness of impression, that I have never seen equalled in modern workmanship"—pp. 6, 7.

Mr. Savage, in pursuing his plan of fully exemplifying the effect of ornamental printing, has given imitations of drawings in sæpiâ and Indian ink, in, from three blocks, increasing to nine—several head-pieces printed as cameos in different tints of the same colours; in heraldry, the arms of Earl Spencer in heraldic colours; in imitation of coloured drawings, a combination of from two to twenty-nine blocks; three specimens in natural history, and three in sculpture; and others of various descriptions. The minutiæ of the process is explained, first, by tables of the coloured inks used in these prints, with definitions of their properties and necessary combinations, and general rules and cautions for the manual operation at the press: this, after the grand point, included in one technical term, the *making-ready,* is effected, is little more than would be dictated by the judgment of any clever, experienced, artist-like pressman. The operations of this method of printing, the various colours used, and the succession of each block, to produce the required effect, appear fully explained in a "Succinct Description of the Illustrations," to which I must refer the curious inquirer: yet, still much, very much, must evidently be left to the taste and judgment of the printer who has leisure to make such experiments. No rule can be laid down for the exact order in which the various blocks of a suite are to be taken—the printer must not only be an artist in the limited acceptation of the term, but in the full extent of the term as applicable to the fine arts of designing, painting, and drawing, or he can never expect to produce the effect of either. It appears necessary, in the first place, to consider that the style of the drawing must be suited to the intended process: next to "analyze the drawing, for the purpose of ascertaining how many blocks it will require, and what parts of it will come into each, and to determine which block shall be first engraved"—all this will require the united operations of the designer, engraver, and printer; and, in some of his pictures, Mr. Savage appears to have had the assistance of the two first-named artists, in an eminent degree. From his account of the difficulties he had to cope with, it is very plain that the practiser of this fancy must have no other business to divide his attention: the whole of the subjects, with one exception, were worked by himself, or his own family.

I think it unnecessary to proceed further with this subject, till some little consideration be given to that important question, by the solution of which the more or less general adoption of every art and science must be regulated; namely, CUI BONO? In posting-bills, lottery-puffs, titles of books, the printing in colours will be ornamental and decorative, but rather expensive; but for producing pictorial subjects "to serve as studies, or for the decorations of rooms, framed and glazed, not to be distinguished from drawings," the *failure* is complete. Every head piece is managed by, first, working the type as a single leaf, then by working three times more, for the three tints of the cameos. The picture illustrative of Collins's "Ode on Mercy," which was intended as the *chef d'œuvre* of this decorative printing, is produced from twenty-nine blocks! thirty colours and tints to work one quarto leaf twenty-nine times over!! now, let the mind run over the probable cost to employ a journeyman capable of such work, and guess if something like the following may not be given as the probable result:—

29 blocks, making-ready, preparing colour, beating, and
4 | pulling, at least four times the time of the operations of
116 | a forme of the work, quarto
4 pages in a forme
464 times the cost of printing a page of fine type-work, exclusive of the expense of the designer, engraver, and box-wood. If for studies or pictures this expense could be borne, it is very plain that in book-decorations it is not likely to answer—if 500 facsimiles were wanted of the picture of Mercy, print it in outline, and the first artists in the country would be glad to colour them up to pattern for one fourth of the money, and produce something like a finished specimen.

I think this picture-print of "Mercy" a monstrous abortion—it is horrible—its only merit is in the patience and difficulty with which it was gestated and brought to parturition. I could wish, as Dr. Johnson said of the lady's piece of difficult music, it had been *impossible:* some other specimens in colours, where so much has not been aimed at, are so much the better; the less that has been attempted, the less is the failure.

In going regularly through the account of the Illustrations, we in time arrive at the finale of specimens of the printing art of Mr. Savage; and as if the climax of disappointment were still in store, after the failure of "Mercy" the list concludes with the "Cavern of Despair;" but what a surprise! what an unexpected reverse and relief to the sickened sensation, does this "Cavern of Despair" really prove! Is it accident or design? Is it meant as *stage effect?* In this picture the mind is refreshed by, and at last rests delighted upon, every excellence that wood-engraving and type-printing ever did or ever will effect. I cannot conceive superiority possible; to attempt any description of it would be folly, except saying, that it is in the true, legitimate mode of printing, one colour, a fine black: take all the other "Illustrations" away, cut out the whole portion of "Decorative Printing," and give me the remainder of the book, with the "Cavern of Despair" designed by THURSTON, and engraved by BRANSTON, and I will preserve it as one of the choicest specimens of typographic skill.

One specimen deserves to be mentioned with commendation for its splendid effect. This is described as an Ornamental Letter B, drawn and engraved by Branston; and executed to show that large ornamented letters might be introduced into books, printed at the type-press in colours, or with different shades of the same colour as cameos; and also to show the introduction of gold by means of the printing-press. This specimen has seven blocks, the lights are printed in gold—it would be rather a dear ornament, since it appears, that, in addition to the number of blocks, the peculiar skill of two typographic artists, besides Mr. Savage, was required to effect it.

Mr. Savage's work, upon the more ordinary operations of printing, contains a great deal of curious and interesting matter. His observations, as well as the extracts taken from Papillon, on the various woods proper for engravings, will be found valuable to the practisers of that art.

There is also, in this work, a valuable paper by Mr. Farraday, of the Royal Institution of Great Britain, entitled "Chemical Analysis of French plate Paper, India yellow Paper, and India white Paper," the chemical details of which are well worth the attention of paper manufacturers. and the subsequent observations particularly interesting to those printers who are curious in the production of good impressions from wood engravings.

"I have no doubt myself" says Mr. Farraday, "that the superiority of the India paper is owing to the peculiar nature of the fibre used in its formation, and not to any particular process in the manufacture of it, or to the addition of any other substance. Indeed, as far as regards the making of it, I think it is inferior to our own; but it has a singular degree of ductility, even in the dry state, which far surpasses any thing I have observed in European paper: the slightest impression of the nail, or other hard body; the mark of a twist, or any form given to it by pressure, remain very perfectly after the force which produced them is removed; and by simple extention of the paper, or other means, these may be removed much more readily and completely than they can from a piece of English paper. Now, I presume that it is to this property, and which belongs to the peculiar fibre of which the paper is composed, that it owes its superiority: it permits the paper to mould itself according to all the inequalities of the surface against which it is pressed; and, consequently, entering and filling up more accurately the lines upon the copper-plate, it receives the ink from every place where it has been deposited, in a more perfect manner than any paper deficient in this quality can do. I endeavoured to convince myself of this, by scratching and cutting up a copper-plate with a steel point, and then covering one half with folded India paper, and the other with French plate paper, submitting the surface thus covered to pressure: I found, on removing it, that though both papers had been in precisely the same circumstances, there was an essential difference in the impressed form received by them: on the French plate paper I could only trace the elevations formed by the deeper lines on the the copper-plate, but on the India paper every mark could be observed which the copper that it covered had received."

Mr. Farraday has confined his experiment and observations to the superiority of India paper for printing from copper-plates, but every reason which he has given applies with equal force to printing from wood. Many of the engravings in this work I would gladly have worked with the type, or as the next best mode, upon the same paper, but separate from the type; not finding this to equal my wishes I tried other samples said to be made of particular fabric suitable to such a purpose, and also a paper made from pure flax, so that no particle of cotton could have entered into the pulp; but they were all equally unsuccessful in competition with the

India paper. I found it impossible to give at once the same intensity of colour to the black shades from the plane surface of the block, and the delicacy of the lighter shades from the engraved part, without, in the first instance, using such a body of ink, and considerable power of impression, as would fill up all the finer parts; and in the latter, by using the ink so sparingly and so light an impression as would not leave sufficient colour for the black parts. The India paper, on the contrary, by the flexibility of texture, and absorbent and congenial quality for fixing the ink, would take every light and shade with much less colour and pressure, and what is of infinite importance in printing, allow the ink to set, or dry, in less time than any other paper. A remarkable instance will be seen in this work in the print of Cogger's Press, which has an extent of black ground, with clearness of the fine lines, and absence of all appearance of ink or oil on the reverse, that never could have been effected if European paper had been used. In fact, it went further, for owing to the qualities united of the paper and the ink (to say nothing of the workmanship) immediately as it was worked no ordinary pressure would cause it to set-off—and on the second day after, I had several copies hot-pressed to try the effect, without finding the colour either to spread or fade.

APPENDIX.

IN page 19, Introduction, I have described the method of printing, which I understand to be practised by the Chinese: since that part was printed, I have been enabled, by the kindness of Mr. Bowyer Nichols, to present a specimen of Chinese printing, which will be, doubtless, interesting, as effected by a process differing so materially from European practice.

My friend has lent me a Chinese engraved *block* (that being the term generally used), although I would rather call it a wooden leaf, its thickness not exceeding ⅝ of an inch, and being engraved on both sides; their mode of taking impressions, as already described, admitting of this, without damage to the underside; and by which is evidently intended a saving both in material, and room in which to store the work; this effectually prevents me from taking an impression by our mode from the thing itself, without great danger of splitting it, and other damage; and the more so, as it is much warped: I have, however, contrived the means of producing almost a complete fac-simile of this curiosity.

The original came out of the collection of the Rev. Dr. Lert, whose account of it is as follows:—

"The title is '*Tsi Tsan Noun Poun—Sing Song Play Book*'—23rd page.* It is a song concerning a gentleman who, soon after his marriage, left his lady to serve the emperor of China in his army. Being falsely accused of treachery he was condemned to die; but his father-in-law proved the accuser to be the traitor, and he was executed."

The block has evidently been very much used; its whole appearance being that of an engraving from which many thousands of impressions have been printed; and that it has been printed from, there is further evidence, from the quantity of dried ink adhering to the sides of the block, which are angular.

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* The characters appear to me to be the 23rd and 24th pages. *H.*

In the library at the India House, I have seen several specimens of the Chinese printing-blocks, in various stages of the process: some having the paper with the characters traced, ready glued to the board; some engraved, but never printed from; others showing signs, like this now before us, of much wear; and one very large block, of [illegible] in outline. But these are only engraved on one side, and have a dovetail at each end to slide into larger blocks by which they are held firm for the workman's use. Several of their engraving and printing tools are also in the same library; the appearance of which confirms the account here given of their method of workmanship.

I have also inspected several Chinese books—and have worked my specimen as nearly like them as I could—as badly as possible—still my apprehension is, that if ever my work be admitted into the Celestial Empire, the Mandarins will not guess it to be an impression (or as nearly so as possible) from their own engraving.

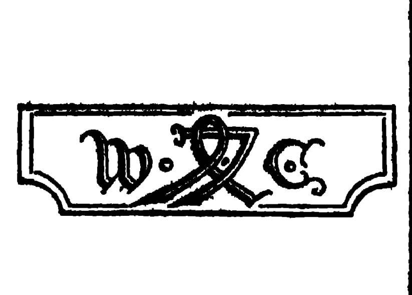
Stereotype Foundry—p. 871.

Since that article was written, and the view engraved, we have had occasion to remove that foundry, [illegible] a larger scale. The only part of the [illegible]ent from that here described, is the [illegible]ing-pot into the pit. This is by means of an [illegible] a rack and pinion, attached to the crane, in lieu of the rope and shackles, by which the pot is lowered and kept at any chosen position; as also a method of fixing and unfixing the claws without the process of unscrewing.

To follow p 910

Devices of early English Printers.—No. I.

1



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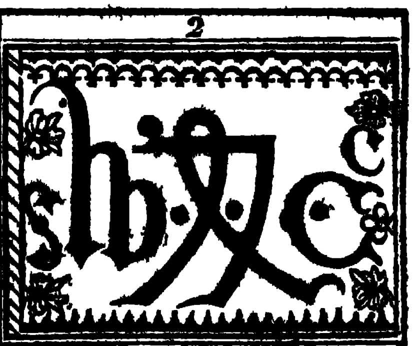

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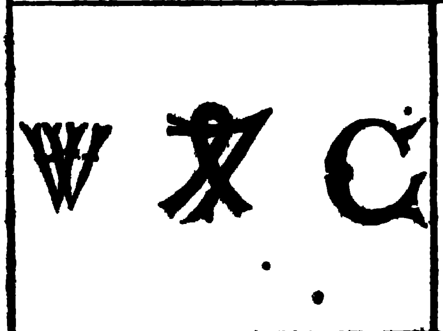

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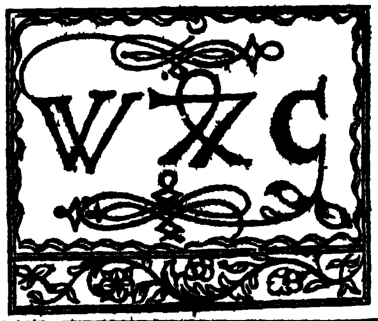

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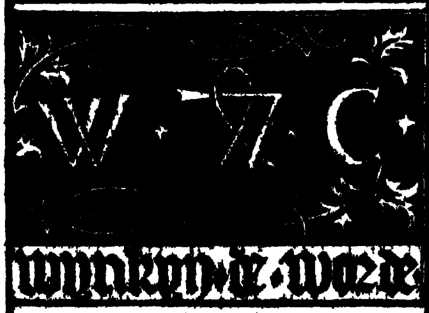

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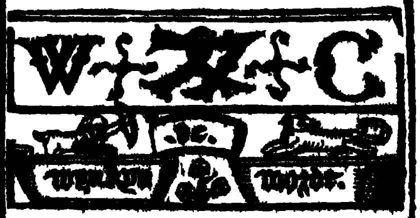
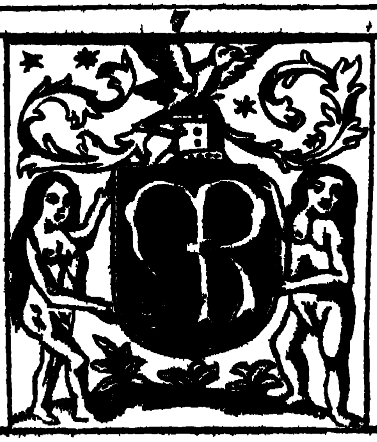
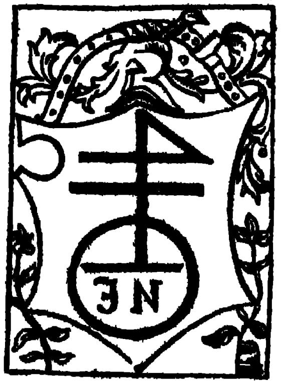


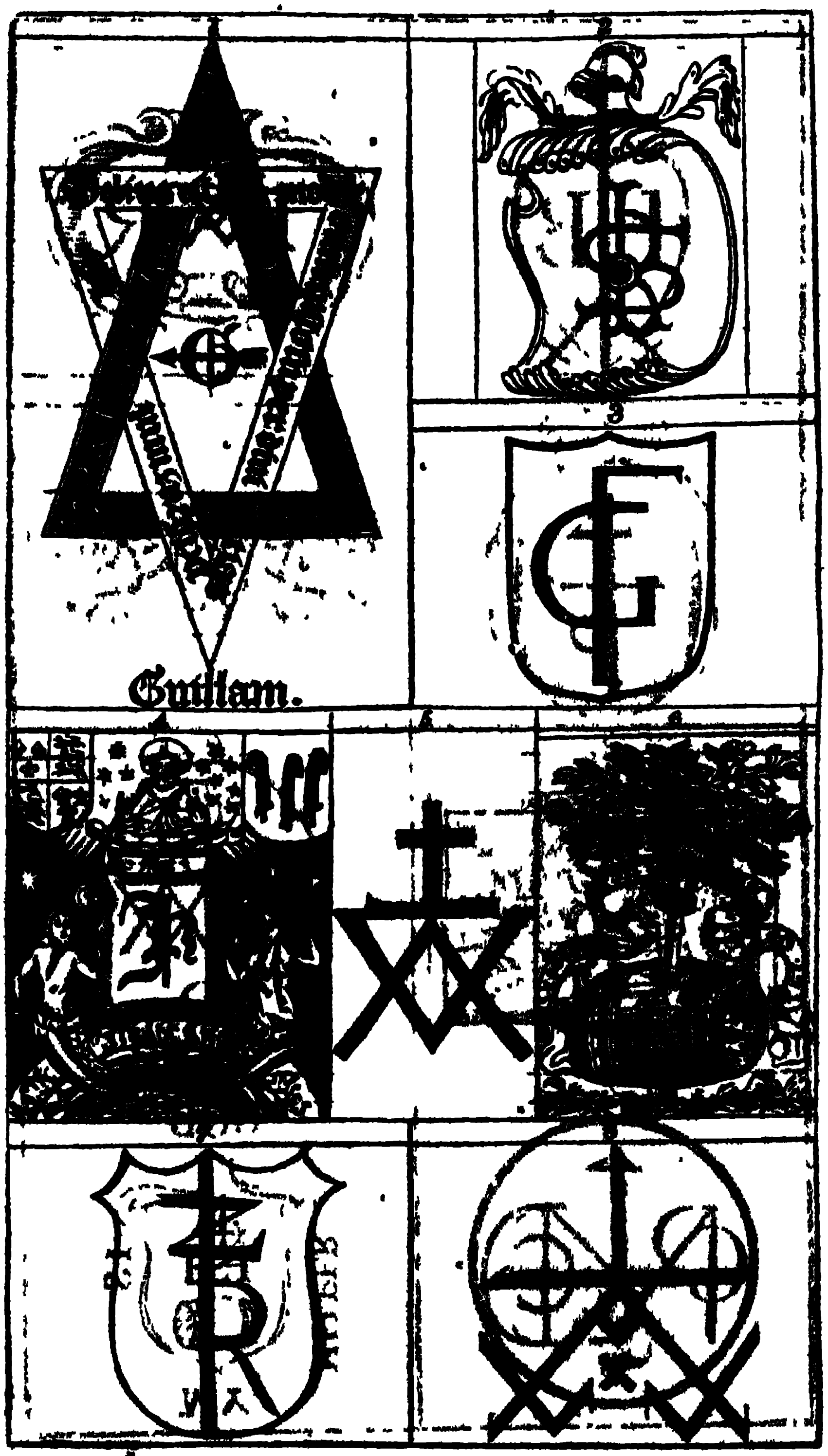
7



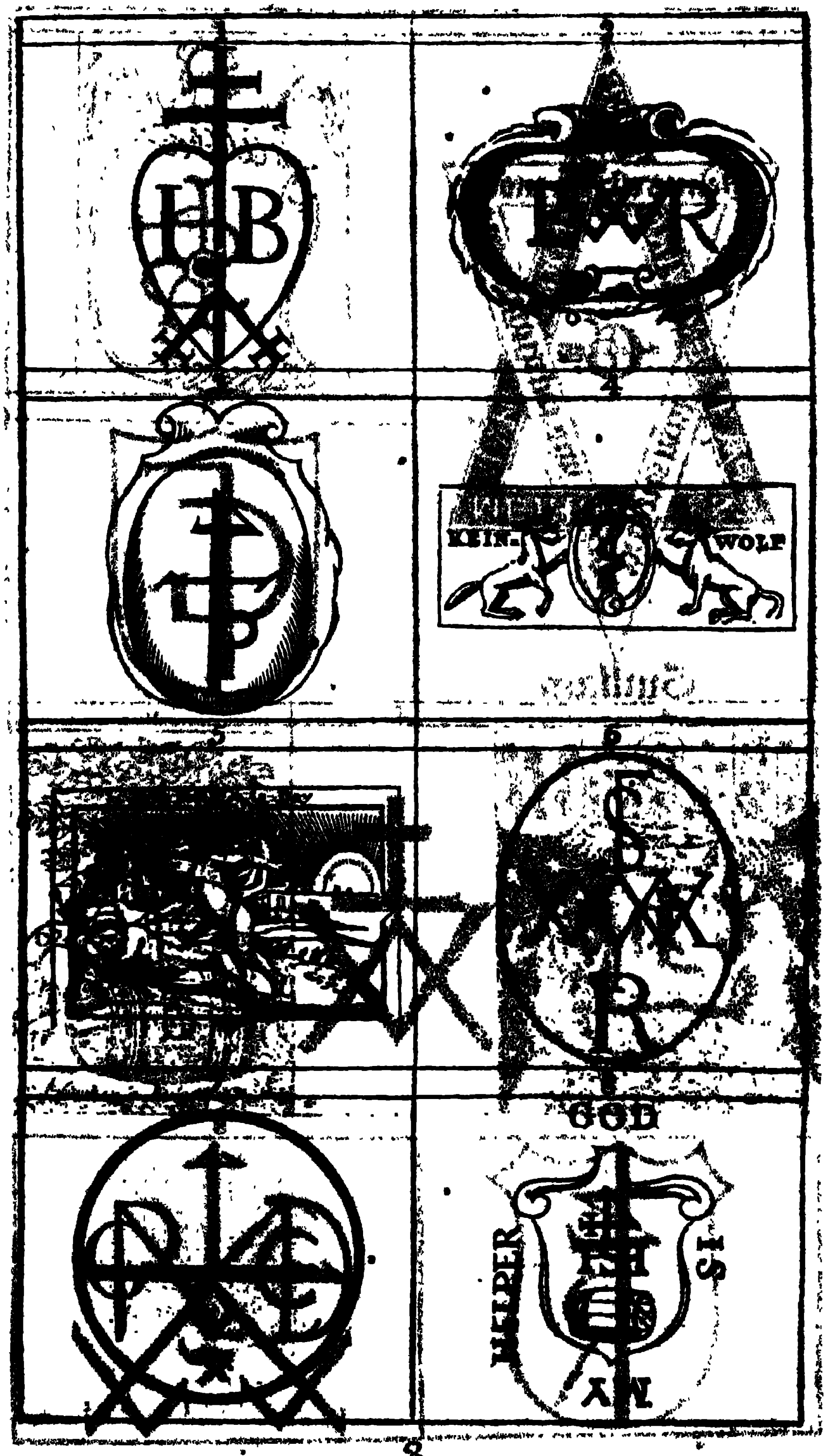
8



Devices of early English Printers.—No. II.



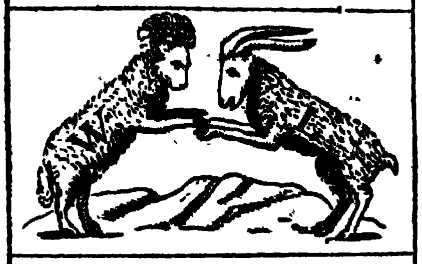
Devices of early English Printers.—No. III.



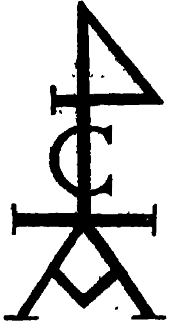
TYPOGRAPHIA:

Devices of early English Printers.—No. IV.

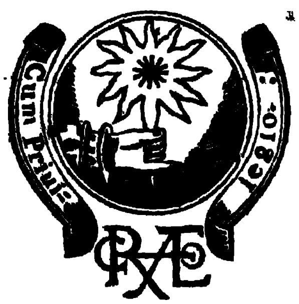
1



2



3



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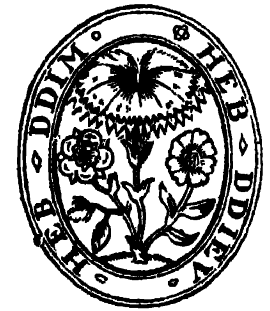
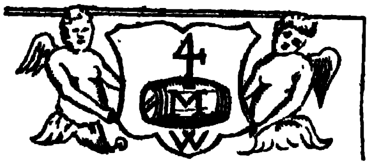

HEB DDIM HEB DDIEV HEB

5



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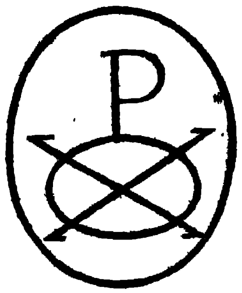

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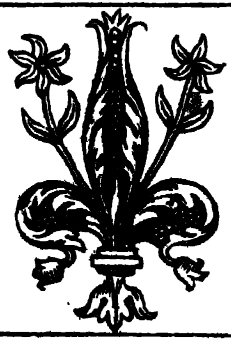

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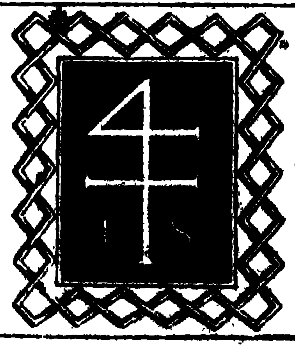


MONOGRAMS AND DEVICES OF EARLY ENGLISH PRINTERS.

(From the Rev T. H. Horne's Introduction to Bibliography—by permission)

Explanation of the opposite Engraving—No 1.

1, 2, and 3, Are the marks affixed by **Caxton** to his publications. Of Caxton, see pp. 90—103

4, 5, and 6. Marks used by Wynkyn de Worde, who, being Caxton's successor, adopted his devices, with some slight alterations. Of him, see pp. 107, &c.

7. A device of Pynson.—See pp. 111 and 141.

8. A device of J. Notary—111

Engraving—No 2.

1 The mark of William Faques [of whom see p. 112]. The sentence in this device, *Melius est modicum justo super divitias peccatorum multas*, is taken, with some variation, from the book of Proverbs, ch. xvi. v 8. And that following, *Melior est patiens viro forti, et qui dominat,* is from Ecclesiastes, ch vii v. 8. (vulgate version).

2 The device of John Skot or Scott —See p. 112.

3. The mark of Thomas Godfray—113

4. The device of John Rastall—113 and 142.

5. The mark of Robert Wyer—114

6. The elegant device of Richard Grafton—117, 148, 155, 158, 164. His motto—*Receive the* INGRAFTED *word* (Epist. St. James, ch. i. v. 21)—has a quaint allusion to his name.

7. The device of John Reynes—115.

8. The mark of Laurence Andrew—114.

Engraving—No. 3.

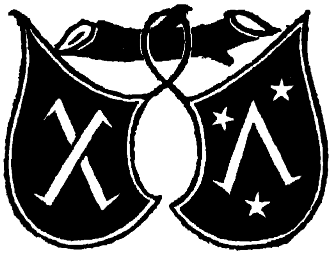
1. The device [illegible]lle.—See p. 116.
2. - - - [illegible]hitchurch—118.
3. - - - of Thomas Petit—118.
4. - - - of Reynold Wolfe—121.
5. - - - of John Day—122.
6. - - - of William Serres—124 and 164.
7. - - - of Richard Jugge—124.
8. - - - of Hugh Singleton—125.

ENGRAVING—No. 4.

1. The device of Gaulter Lynn—See p. 126.
2. - - - of John Cawood—127 and 165.
3. - - - of Richard Tottel—128.
4. - - - of Richard Jones—133.
5. - - - of William Middleton—120.
6. - - - of Thomas Purfoot—132.
7. - - - of John Wolfe, City Printer—136.
8. - - - of John Siberch—190.

The display of monograms and devices of early printers is continued, to a considerable extent, both of English and foreign printers, by Mr. Horne, to whom I must now refer my readers who may be curious in this branch of typography. The specimens I have given will be sufficient to excite their curiosity, which in his work will find a rich treat.

The following represents the device affixed to the celebrated Psalter of Mayence.—See pp. 46. 913.



SCALE OF PRIMAS.

No. of Sheet.	Signatures.	FOLIO.		QUARTO.		OCTAVO.	TWELVES. (Half-Sheets.)	TWELVES. (Sheets.)	Signatures.	No. of Sheet.
		1st and 2nd.	3rd and 4th.	1st and 2nd.	3rd and 4th.					
			181		361		1			
1	B	1	185	1	369	1	13	1	B	1
2	C	5	189	9	377	17	25	25	C	2
3	D	9	193	17	385	33	37	49	D	3
4	E	13	197	25	393	49	49	73	E	4
5	F	17	201	33	401	65	61	97	F	5
6	G	21	205	41	409	81	73	121	G	6
7	H	25	209	49	417	97	85	145	H	7
8	I	29	213	57	425	113	97	169	I	8
9	K	33	217	65	433	129	109	193	K	9
10	L	37	221	73	441	145	121	217	L	10
11	M	41	225	81	449	161	133	241	M	11
12	N	45	229	89	457	177	145	265	N	12
13	O	49	233	97	465	193	157	289	O	13
14	P	53	237	105	473	209	169	313	P	14
15	Q	57	241	113	481	225	181	337	Q	15
16	R	61	245	121	489	241	193	361	R	16
17	S	65	249	129	497	257	205	385	S	17
18	T	69	253	137	505	273	217	409	T	18
19	U	73	257	145	513	289	229	433	U	19
20	X	77	261	153	521	305	241	457	X	20
21	Y	81	265	161	529	321	253	481	Y	21
22	Z	85	269	169	537	337	265	505	Z	22
23	2 A	89	273	177	545	353	277		2A	23
24	B	93	277	185	553	369	289	EIGH-TEENS	B	24
25	C	97	281	193	561	385	301		C	25
26	D	101	285	201	569	401	313	B C D	D	26
27	E	105	289	209	577	417	325	1	E	27
28	F	109	293	217	585	433	337		F	28
29	G	113	297	225	593	449	349	E F G	G	29
30	H	117	301	233	601	465	361	37	H	30
31	I	121	305	241	609	481	373	H I K	I	31
32	K	125	309	249	617	497	385		K	32
33	L	129	313	257	625	513	397	73	L	33
34	M	133	317	265	633	529	409	L M N	M	34
35	N	137	321	273	641	545	421	109	N	35
36	O	141	325	281	649	561	433	O P Q	O	36
37	P	145	329	289	657	577	445		P	37
38	Q	149	333	297	665	593	457	145	Q	38
39	R	153	337	305	673	609	469	R S T	R	39
40	S	157	341	313	681	625	481	181	S	40
41	T	161	345	321	689	641	493		T	41
42	U	165	349	329	697	657	505	U X Y	U	42
43	X	169	353	337	705	673	517	217	X	43
44	Y	173	357	345	713	689	529	Z	Y	44
45	Z	177	361	353	721	705	541	253	Z	45

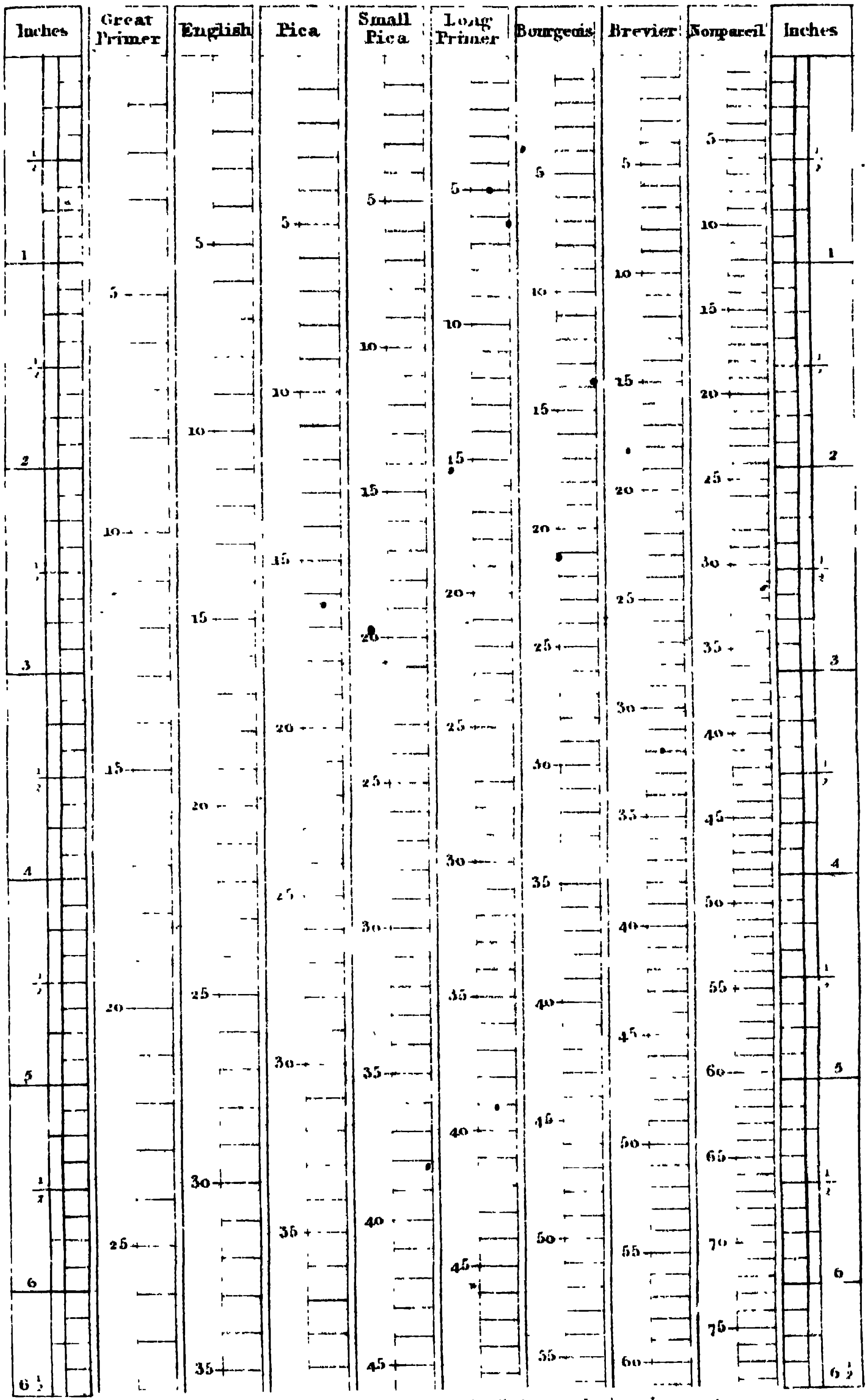
The Primas of Octavo Half-Sheets are the same as those of Quarto Sheets.

TYPOGRAPHIC SCALE by which Compositors Work is measured

ENGLISH	PICA	SM PICA.	LONG PRIMER	BOURGEOIS	BREVIER	MINION	NONPAREIL
1m	1m	1m	1m	1m	1m	1m	1m
2m	2m	2m	2m	2m	2m	2m	2m
3m	3m	3m	3m	3m	3m	3m	3m
4m	4m	4m	4m	4m	4m	4m	4m
5m	5m	5m	5m	5m	5m	5m	5m
6m	6m	6m	6m	6m	6m	6m	6m
7m	7m	7m	7m	7m	7m	7m	7m
8m	8m	8m	8m	8m	8m	8m	8m
9m	9m	9m	9m	9m	9m	9m	9m
10m	10m	10m	10m	10m	10m	10m	10m
11m	11m	11m	11m	11m	11m	11m	11m
12m	12m	12m	12m	12m	12m	12m	12m
13m	13m	13m	13m	13m	13m	13m	13m
14m	14m	14m	14m	14m	14m	14m	14m
15m	15m	15m	15m	15m	15m	15m	15m
16m	16m	16m	16m	16m	16m	16m	16m
17m	17m	17m	17m	17m	17m	17m	17m
18m	18m	18m	18m	18m	18m	18m	18m
19m	19m	19m	19m	19m	19m	19m	19m
20m	20m	20m	20m	20m	20m	20m	20m
21m	21m	21m	21m	21m	21m	21m	21m
22m	22m	22m	22m	22m	22m	22m	22m
23m	23m	23m	23m	23m	23m	23m	23m
24m	24m	24m	24m	24m	24m	24m	24m
25m	25m	25m	25m	25m	25m	25m	25m
26m	26m	26m	26m	26m	26m	26m	26m
27m	27m	27m	27m	27m	27m	27m	27m
28m	28m	28m	28m	28m	28m	28m	28m
29m	29m	29m	29m	29m	29m	29m	29m
30m	30m	30m	30m	30m	30m	30m	30m
31m	31m	31m	31m	31m	31m	31m	31m
32m	32m	32m	32m	32m	32m	32m	32m
33m	33m	33m	33m	33m	33m	33m	33m
34m	34m	34m	34m	34m	34m	34m	34m
35m	35m	35m	35m	35m	35m	35m	35m
36m	36m	36m	36m	36m	36m	36m	36m
	37m	37m	37m	37m	37m	37m	37m
	38m	38m	38m	38m	38m	38m	38m
	39m	39m	39m	39m	39m	39m	39m
	40m	40m	40m	40m	40m	40m	40m
		41m	41m	41m	41m	41m	41m
		42m	42m	42m	42m	42m	42m
		43m	43m	43m	43m	43m	43m
		44m	44m	44m	44m	44m	44m
		45m	45m	45m	45m	45m	45m
		46m	46m	46m	46m	46m	46m
			47m	47m	47m	47m	47m
			48m	48m	48m	48m	48m
			49m	49m	49m	49m	49m
			50m	50m	50m	50m	50m
			51m	51m	51m	51m	51m
				52m	52m	52m	52m
				53m	53m	53m	53m
				54m	54m	54m	54m
				55m	55m	55m	55m
				56m	56m	56m	56m
				57m	57m	57m	57m
					58m	58m	58m
					59m	59m	59m
					60m	60m	60m
					61m	61m	61m
					62m	62m	62m
						63m	63m
						64m	64m
						65m	65m
						66m	66m
						67m	67m
						68m	68m
							69m
							70m
							71m
							72m
							73m
							74m
							75m
							76m
							77m
							78m
							79m
							80m

TYPOGRAPHIA.

Scale of Sizes from Great Primer to Nonpareil inclusive.



This Scale is Printed dry to prevent shrinking, and will therefore be found accurate

Baldwin, Cradock & Joy

Calculations of the NUMBER of LETTERS contained in

OCTAVO.											
15	28 13440	29 13920	30 14400	31 14880	32 15360	25	48 38400	49 39200	50 40000	51 40800	52 41600
15½	29 14384	30 14880	31 15376	32 15872	33 16368	25½	49 39984	50 40800	51 41616	52 42432	53 43248
16	30 15360	31 15872	32 16384	33 16896	34 17408	26	50 41600	51 42432	52 43264	53 44096	54 44928
16½	31 16368	32 16896	33 17424	34 17952	35 18480	26½	51 43248	52 44096	53 44944	54 45792	55 46640
17	32 17408	33 17952	34 18496	35 19040	36 19584	27	52 44928	53 45792	54 46656	55 47520	56 48380
17½	33 18480	34 19040	35 10600	36 20160	37 20720	27½	53 46640	54 47520	55 48400	56 49280	57 50160
18	34 19584	35 20160	36 20736	37 21312	38 21888	28	54 48384	55 49280	56 50176	57 51072	58 51968
18½	35 20720	36 21312	37 21904	38 22496	39 23088	28½	55 50160	56 51072	57 51984	58 52896	59 53808
19	36 21888	37 22496	38 23104	39 24712	40 24320	29	56 51968	57 52896	58 53824	59 54752	60 55680
19½	37 23088	38 23712	39 24336	40 24960	41 25584	29½	57 53808	58 54752	59 55696	60 56640	61 57584
20	38 24320	39 24960	40 25600	41 26240	42 26880	30	58 55680	59 56640	60 57600	61 58560	62 59520
20½	39 25584	40 26240	41 26896	42 27552	43 28208	30½	59 57584	60 58560	61 59536	62 60512	63 61488
21	40 26880	41 27552	42 28224	43 28896	44 29568	31	60 59520	61 60512	62 61504	63 62496	64 63488
21½	41 28208	42 28896	43 29584	44 30272	45 30960	31½	61 61488	62 62496	63 63504	64 64512	65 65520
22	42 29568	43 30272	44 30976	45 31680	46 32384	32	62 63488	63 64512	64 65536	65 66560	66 67584
22½	43 30960	44 31680	45 32400	46 33120	47 33850	32½	63 65520	64 66560	65 67600	66 68640	67 69680
23	44 32384	45 33120	46 33856	47 34592	48 35328	33	64 67584	65 68640	66 69696	67 70752	68 71808
23½	45 33840	46 34592	47 35344	48 36096	49 36848	33½	65 69680	66 70752	67 71824	68 72896	69 73968
24	46 35328	47 36096	48 36864	49 37632	50 38400	34	66 71808	67 72896	68 73948	69 75072	70 76160
24½	47 36848	48 37632	49 38416	50 39200	51 39984	34½	67 73968	68 75072	69 76176	70 77280	71 78384

These Tables contain Calculations of the Number of Letters, as cast up by the Rule in pp 778, 9. The red figures show the width and length, the black figures the number of letters in the sheet. *Ex.* Octavo 23½ × 47 = 35344.

a SHEET of OCTAVO, TWELVES, and EIGHTEENS.

DUODECIMO.

	12480	13104	13728	14352	14976		44160	45264	46368	47472	48576
	13608	14256	14904	15552	16200		46248	47376	48504	49632	50760
	14784	15456	16128	16800	17472		48384	49536	50688	51840	52992
	16008	16704	17400	18096	18792		50568	51744	52920	54096	55272
	17280	18000	18720	19440	20160		52800	54000	55200	56400	57600
	18600	19344	20088	20832	21576		55080	56304	57528	58752	59976
	19968	20736	21504	22272	23040		57408	58656	59904	61152	62400
	21384	22176	22968	23760	24552		59784	61056	62328	63600	64872
	22848	23664	24480	25296	26112		62208	63504	64800	66096	67392
	24360	25200	26040	26880	27720		64680	66000	67320	68640	69960
	25920	26784	27648	28512	29376		67200	68544	69888	71232	72576
	27528	28416	29304	30192	31080		69768	71136	72504	73872	75240
	29184	30096	31008	31920	32832		72384	73776	75168	76560	77952
	30888	31824	32760	33696	34632		75048	76464	77880	79296	80712
	32640	33600	34560	35520	36480		77760	79200	80640	82080	83520
	34440	35424	36408	37392	38376		80520	81984	83448	84912	86376
	36288	37296	38304	39312	40320		83328	84816	86304	87792	89280
	38184	39216	40248	41280	42312		86184	87696	89208	90720	92232
	40128	41184	42240	43296	44352		89088	90624	92160	93696	95232
	42120	43200	44280	45360	46440		92040	93600	95160	96720	98280

EIGHTEENS.

To find the Letters in a sheet of Eighteens, take the measures of the Twelves, divide by 2, and add the product. *Ex.* [illegible] × [illegible] =

$$\left\{\begin{array}{r} 2)12480 \\ \underline{6240} \\ 18720 \end{array}\right.$$

TECHNICAL TERMS USED IN PRINTING.

Ball-knife.—A blunt knife used to scrape the pelt-balls.

Ball-nails.—Square-headed nails used in knocking up balls.

Bank.—A stage about four feet high, placed near the press.

Beard of a letter.—The outer angle of the square shoulder of the shank which reaches almost to the face of the letter, and commonly scraped off by founders.

Bearer.—A piece of reglet to bear the impression off a blank page.

Bite.—Is when the inked impression of the page, or any part of it, is prevented by the frisket's not being sufficiently cut out.

Blankets.—Woollen cloth, or white baize, to lay between the tympans.

Body.—The shank of the letter.

Bottle-arsed.—When letter is wider at the bottom than the top.

Bottom-line.—The last line of the page preceding the catch-line.

Brayer.—Is a round wooden rubber, almost of the fashion of a ball-stock, but flat at the bottom, and not above three inches diameter: it is used in the ink-block to bray or rub ink.

Break.—A short line.

Broadside.—A forme of one full page, printed on one side of a whole sheet of paper.

Broken letter.—By broken letter is not meant the breaking of the shanks of any of the letters, but the breaking of the orderly succession in which the letters stood, in a line, page, or forme, &c. and mingling them together, which mingled letters are called pie.—It is more properly termed broken matter.

Bur.—When the founder has neglected to take off the roughness of the letter in dressing.

Cards.—About a quire of paper, which pressmen use to pull down the spring or rising of a forme, which it is many times subject to by hard locking-up.

Cassie paper.—Broken paper.

Choke.—If a forme be not washed in due time, the ink will get into the hollows of the face of the letter; and that getting-in of the ink is called choking of the letter, or choking of the forme.

Clean proof.—When a proof has but few faults in it, it is called a clean proof; and when a proof is to be sent to the author, the pressmen are ordered to pull a clean proof.

Close matter.—Matter with few breaks or whites.

Correct.—When the corrector reads the proof, or the compositor mends the faults marked in the proof, they are both said to correct; the corrector the proof, the compositor the forme.

Corrections.—The letters marked in the proof are called corrections.

Devil.—The errand-boy of a printing-office.

Direction.—The word that stands alone on the right-hand, next to the bottom line of a page.

Direction-line.—The line the direction stands in.

Double.—Among compositors, a repetition of words; also, among pressmen, a sheet that is twice pulled and lifted ever so little off the forme after it was first pulled, most commonly (through the play of the joints of the tympan) takes a double impression: this sheet is said to double. Doubling also happens by the loose hanging of the platten, and by too much play which the tenons of the head may have in the mortises of the cheeks; it may also be occasioned by the decay of several parts of the press.

Dressing a chase, or forme.—The fitting the pages and chase with furniture and quoins.

Drive out.—When a compositor sets wide.

Empty press.—A press that is unemployed. In general every printing-office has one for a proof-press.

Even page.—The 2nd, 4th, 6th, or any other even-numbered page.

Fat face, or fat letter,—Is a broad-stemmed letter.

Fat work,—Is when there are many white-lines or break-lines in a work.

Fat forme.—When the pressman has a single pull.

First forme.—The forme the white paper is printed on, which generally has the first page of the sheet in it.

Fly.—The person that takes off the sheet from the press in cases of expedition.

Follow.—That is, "see if it follows"; is a term used as well by the corrector as by the compositor and pressman. It is used by the corrector and compositor when they examine how the beginning matter of the succeeding page agrees with the ending matter of the precedent page; and how the folios of those pages properly and numerically follow and succeed one another, lest the pages should be transposed. But the pressman only examines that the folio and beginning word of the second page and signature of the first and third page, when the reiteration is on the press, follow the folio and direction of the first page, and the signature of the third page follows the signature of the first page, lest the forme should be laid wrong on the press.

Foot of a page.—The bottom or end of a page.

Forme.—The pages when fitted into a chase.

Foul proof.—When a proof has many faults marked in it.

Fount.—The whole number of letters that are cast of the same body and face.

Friar.—When the balls do not take, the un-taking part of the balls that touches the forme will be left white; or if the pressmen skip over any part of the forme, and do not touch it with the balls, though they do take, yet in both these cases the white places are called friars.

Full forme or page.—A forme or page with few or no breaks or white-lines.

Full press.—When two men work at the press.

Fudge.—To contrive without necessary materials, or do work in a bungling manner.

Get-in.—Matter is got in in a line, page, sheet, or book, if letter be thinner cast than the printed copy the compositor sets from; or matter is got in if the compositor sets closer.

Good colour.—Sheets printed neither too black nor too white.

Good work,—Is so called in a twofold sense: the master-printer calls it good work when the compositors and pressmen have done their duty; and the workmen call it good work, if it be light, easy work, and they have a good price for it.

Half press.—When but one man works at the press.

Head-page.—The beginning of a subject.

Heap.—So many reams or quires as are set out by the warehouse-keeper for the pressman to wet.

Heap holds out.—When it has its full number of sheets.

Holds out or not holds out.—These terms are applicable to the quires of white paper, to wrought-off heaps, to gathered books, and sorts of letter, &c. If quires of white paper have twenty-five sheets each in them, they say, the paper holds out five and twenties. Of wrought-off heaps, the heap that comes off first in gathering is said not to hold out. Of gathered books, if the intended number of perfect books are gathered, they say the impression holds out; but if the intended number of perfect books cannot be gathered off the heaps, they say the impression holds not out. And so for sorts of letter.

Horse.—The stage on which the pressmen set the heaps of paper on their banks.

Horse.—If any journeyman set down in his bill on Saturday-night more work than he has done, that surplus is called horse.

Hours.—Pressmen reckon their work by hours, reckoning every token to be an hour's work; and though it be the same effectually with tokens, yet they make their prices of different work by the hour, and it passes current for a token. If two men work at the press, ten quires is an hour; if one man, five quires is an hour.

Imperfections of letters.—When the founder has not cast a proportional number of each sort of letter, it is making the rest of the fount imperfect.

Insertion.—If the compositor has left out words or lines, the corrector inserts them, and makes this mark ʌ where they are left out.

Keep in,—Is a caution either given to, or resolved on, by the compositor, when there may be doubt of driving out his matter beyond his counting-off, wherefore he sets close to keep in.

Keep out.—The practice opposite to the preceding.

Kern of a letter.—That part which hangs over the body or shank.

Lean face.—A letter whose stems and strokes have not their full width.

Letter hangs,—If the compositor is careless in emptying his composing-stick, so as to set the letter loosely down in the galley, and it stands not perfectly square and upright, the letter hangs; or if after overrunning on the correcting stone, he has not set his letter in a square position again, before he locks up, the letter thus out of square is said to hang.

Long pull,—Is when the bar of the press requires to be brought close to the cheek to make a good impression.

Low case.—When the compositor has composed almost all the letters out of his case.

Mackle.—When part of the impression on a page appears double, owing to the platten's dragging on the frisket.

Matter.—Compositor's copy; also the letter, when composed, is called matter.

Measure.—The width of a page.

Monk.—When the pressman has not distributed his balls, and the ink lies in blotches, it is called a monk.

Naked forme.—When the furniture is taken from about all the sides of the pages.

Odd page.—The 1st, 3rd, and all uneven-numbered pages.

Off.—Pressmen are said to be off when they have worked off the designed number from a forme.

Out.—A compositor is said to be out when he has composed all his copy.

Out of register.—When pages are not worked even on each other.

Pale colour.—When the sheets are worked off with too little ink.

Pelts.—Untanned sheep-skins used for balls.

Picks.—When any dirt gets into the hollows of the letter, which chokes up the face of it, and occasions a spot.

Point-holes.—Holes made by the points in a worked-off sheet of paper.

Press goes.—When the pressmen are at work.

Pie.—When a page is broken, and the letters confused.

Quarters.—Octavos and twelves formes are said to be imposed in quarters, not from their equal divisions, but because they are imposed and locked up in four parts.

Register-sheet.—Sheet or sheets printed to make register with.

Reiteration.—The second forme, or the forme printed on the back-side of the white paper.

Reglet.—A thin sort of furniture, of an equal thickness all its length. It is quadrat high, of several thicknesses.

Rise.—A forme is said to rise, when in rearing it off the correcting-stone no letter or furniture, &c. drop out.

Runs on sorts.—When only a few sorts of letters are used in a work.

Set off.—Sheets that are newly worked off at the press often set off, and more particularly so when beaten with soft ink.

Shank.—The square metal the face of a letter stands on.

Signature.—Any letter of the alphabet used at the bottom of the first page of a sheet, as a direction for the binders to place the sheets in a volume.

Slur.—When the impression of the sheets appear smeared.

Smouting.—When either compositors or pressmen are employed for a short time, and not engaged for a constancy.

Sorts.—The letters that lie in every box of the case are separately called sorts in printers' and founders' language.

Spanish [*q' Span-hitch*].—A slight kind of pull at a common wood-press.

Squabble.—A page or forme is squabbled when the letter of one or more lines are got into any of the adjacent lines; or that the letter or letters are twisted about out of their square position.

Stem.—The name given to the straight, flat strokes of a straight letter.

Superior letters.—These are often set to marginal notes, references, or authorities; they are letters of a small face, justified by the founder in the mould near the top of the line.

Thin space,—Ought by a strict, orderly, and methodical measure, to be made of the thickness of the seventh part of the body; though founders make them indifferently thicker or thinner.

Turn for a letter.—It often happens when matter runs upon sorts, especially in capitals or some other sorts seldom used, that the compositor wants that sort the matter runs on; and he is loath to distribute letter for that sort, as perhaps his case is otherwise full: therefore, he turns a letter of the same thickness, with the foot of the shank upwards, and the face downwards; which turned letter being easily to be seen, he afterwards, when he can accommodate himself with the right sort, takes out, and puts the right letter in its room. It is also a word used jocosely in the chapel; as, when any one complains of wanting any thing—he is answered, "Turn for it"—that is, "make shift for it."

Vantage.—When a white page or more happens in a sheet, the compositor calls that vantage: so does the pressman, when a forme of one pull comes to the press.

Underhand.—A phrase used by pressmen for the light and easy, or heavy and hard running in of the carriage. Thus they say, the press goes light and easy underhand, or it goes heavy or hard underhand.

Upper-hand.—When the spindle goes soft and easy, the pressmen say, it goes well upper-hand or above-hand. But the contrary if it goes hard and heavy.

White-line.—A line of quadrats.

White-page.—A page that no matter comes in.

White-paper.—Although the first forme be printed off, yet pressmen call that heap white-paper, till the reiteration be printed.

Chiswell Street New Script.

A	B	C	D	E	F	G	H	I	K	L	M	N	O
P	Q	R	S	T	U	V	W	X	Y	Z	J	$.^{\underline{r}}$	$.^{\underline{o}}\ .^{\underline{d}}$
1	2	3	4	5	6	7	8	9	0	£	¼	½	¾
(	)	!	?	‘ ’	&	—	,	;	:	.	=	$ſs^{1}$	$ſs^{2}$
a	a	am	an	ar	as^{1}	as^{2}	av	av^{2}	b^{1}	b^{2}	c	c	cr
cs^{1}	cs^{2}	d	d	ds^{1}	ds^{2}	e	e	em	en	er	es^{1}	es^{2}	ev^{1}
ev^{2}	f	ff	g	g	gs^{1}	gs^{2}	h	h	hs^{1}	hs^{2}	i	i	im

in	ir	is[1]	is[2]	iv[1]	iv[2]	k	k	ks[1]	ks[2]	l	l	ls[1]	ls[2]
m	m	m	m	ms[1]	ms[2]	ms[1]	ms[2]	n	n	n	n	ns[1]	ns[2]
ns[1]	ns[2]	o[1]	o[2]	p	p	pr	ps[1]	ps[2]	q	r	r	r	r
r	r	r	r	rs[1]	rs[2]	rs[1]	rs[2]	s[1]	s[2]	s[1]	s[2]	t	t
t	tr	ts[1]	ts[2]	u	u	um	un	ur	us[1]	us[2]	v[1]	v[2]	v[1]
v[2]	w[1]	w[2]	n[1]	n[2]	x	y	y	y	y	ys[1]	ys[2]	ys[1]	ys[2]
z	ſ	Line be-	-ginnings.	Thin space.	Thick	Space.	Hair Space.	n quad.	m quad.	Line-	-endings.	Quadrats	(common).

Those sorts marked with [1] *are cast thin, for joining with those letters which commence with a junction stroke, as m, n, r, v, w, x, y, z, and the compounds commencing with those letters. Those marked with* [2]*, and distinguished by an extra nick, are cast thick, to go before a, b, c, d, e, f, g, h, i, k, l, o, p, q, t, u, &c.*

ABSTRACTS OF ACTS

RELATIVE TO

PRINTERS AND BOOKSELLERS.

By the Act 13 Geo. II. cap. 19 (to restrain and prevent the excessive increase of horse races, &c.) it is enacted, "That every person or persons who shall make, print, publish, advertise, or proclaim any advertisement or notice of any plate, prize, sum of money, or other thing, of less value than fifty pounds, to be run for by any horse, mare, or gelding, shall forfeit and lose the sum of one hundred pounds."

By the Act 25 Geo. II. cap. 36 (for the better preventing thefts and robberies), it is enacted, "That any person publicly advertising a reward with 'No questions asked,' for the return of things which have been stolen or lost, or making use of any such words in such public advertisements, &c. shall for every such offence forfeit fifty pounds."

The Act 39 Geo. III. cap. 79 (for the more effectual suppression of societies established for seditious and treasonable purposes), contains several provisions and penalties respecting printers, letter-founders, and printing-press makers.

Sect. 23 enacts, "That, from and after the expiration of forty days from the day of passing this Act, every person having any printing press, or types for printing, shall cause a notice thereof, signed in the presence of and attested by one witness, to be delivered to the clerk of the peace acting for the county, stewartry, riding, division, city, borough, town, or place, where the same shall be intended to be used, or his deputy, according to the form prescribed in the schedule hereunto annexed; and such clerk of the peace, or deputy, respectively, shall, and he is hereby authorized and required to grant a certificate in the form prescribed in the schedule hereunto annexed, for which such clerk of the peace, or deputy, shall receive the fee of one shilling, and no more; and such clerk of the peace, or his deputy, shall file such notice, and transmit an attested copy thereof to one of his Majesty's principal secretaries of state; and every person who, not having delivered such notice and obtained such certificate as aforesaid, shall, from and after the expiration of forty days next after the passing of this Act, keep or use any printing press or types for printing, or having delivered such notice and obtained such certificate as aforesaid, shall use any printing press or types for printing in any other place than the place expressed in such notice, shall forfeit and lose the sum of twenty pounds."

Sect. 24 exempts his Majesty's printers, and the public presses belonging to the two Universities.

Sect. 25 and 26 relate to type-founders and printing-press makers.

Sect. 27 enacts, "That from and after the expiration of forty days after the passing of this Act, every person who shall print any paper or book whatsoever, which shall be meant or intended to be published or dispersed, whether the same shall be sold or given away, shall print upon the front of every such paper, if the same shall be printed on one side only, and upon the first and last leaves of every paper or book which shall consist of more than one leaf, in legible characters, his or her name, and the name of the city, town, parish, or place, and also the name (if any) of the square, street, lane, court, or place, in which his or her dwelling-house, or usual place of abode shall be ; and every person who shall omit so to print his name and place of abode on every such paper or book printed by him, and also every person who shall publish or disperse, or assist in publishing or dispersing, either gratis or for money, any printed paper or book, which shall have been printed after the expiration of forty days from the passing of this Act, and on which the name and place of abode of the person printing the same shall not be printed as aforesaid, shall, for every copy of such paper so published or dispersed by him, forfeit and pay the sum of twenty pounds."

Sect. 28 exempts papers printed by authority of either house of parliament.

Sect. 29 enacts, "That every person who, from and after the expiration of forty days after the passing of this Act, shall print any paper for hire, reward, gain, or profit, shall carefully preserve and keep one copy (at least) of every paper so printed by him or her, on which he or she shall write, or cause to be written or printed, in fair and legible characters, the name and place of abode of the person or persons by whom he or she shall be employed to print the same; and every person printing any paper for hire, reward, gain, or profit, who shall omit or neglect to write, or cause to be written or printed as aforesaid, the name and place of his or her employer on one of such printed papers, or to keep or preserve the same for the space of six calendar months next after the printing thereof, or to produce and show the same to any justice of the peace, who, within the said space of six calendar months, shall require to see the same, shall, for every such omission, neglect, or refusal, forfeit and lose the sum of twenty pounds."

Form of Notice to be given to the Clerk of the Peace, that any Person keeps any Printing Press or Types for Printing.

To the Clerk of the Peace for ——— [here insert the county, stewartry, riding, division, city, borough, town, or place], or his deputy.

I, A. B, of ——— do hereby declare that I have a printing-press and types for printing, which I propose to use for printing within ———, and which I require to be entered for that purpose, in pursuance of an Act passed in the thirty-ninth year of the reign of his Majesty King George the Third, entitled, "An Act for the more effectual suppression of societies established for seditious and treasonable purposes, and for better preventing treasonable and seditious practices."

Witness my hand this —— day of ———.

Signed in the presence of ———.

Act 60 Geo. III. cap. viii.—*For the more effectual Prevention and Punishment of Blasphemous and Seditious Libels.*

Commences by declaring that it is expedient to make more effectual provision for the punishment of blasphemous and seditious libels; and then proceeds to enact; I. That from and after the passing of the act, in every case in which any verdict or judgment by default shall be had against any person for composing, printing, or publishing any blasphemous libel, or any seditious libel, tending to bring into hatred or contempt the person of his majesty, his heirs or successors, or the regent, or the government and constitution of the United Kingdom as by law established, or either house of parliament, or to excite his majesty's subjects to attempt the alteration of any matter in church or state as by law established, otherwise than by lawful means, it shall be lawful for the judge, or the court before whom or in which such verdict shall have been given, or the court in which such judgment by default shall be had, to make an order for the seizure and carrying away and detaining in safe custody, in such manner as shall be directed in such order, all copies of the libel which shall be in the possession of the person against whom such verdict or judgment shall have been had, or in the possession of any other person named in the order for his use; evidence upon oath having been previously given to the satisfaction of such court or judge, that a copy or copies of the said libel is or are in the possession of such other person for the use of the person against whom such verdict or judgment shall have been had as aforesaid; and in every such case it shall be lawful for any justice of the peace, or for any constable or other peace-officer acting under any such order, or for any person or persons acting with or in aid of any such justice of the peace, constable, or other peace-officer, to search for any copies of such libel in any house, building, or other place whatsoever belonging to the person against whom any such verdict or judgment shall have been had, or to any other person so named, in whose possession any copies of any such libel, belonging to the person against whom any such verdict or judgment shall have been had, shall be; and in case admission shall be refused or not obtained within a reasonable time after it shall have been first demanded, to enter by force by day into any such house, building, or place whatsoever, and to carry away all copies of the libel there found, and to detain the same in safe custody until the same shall be restored under the provisions of this act, or disposed of according to any further order made in relation thereto.

II. That if in any such case as aforesaid judgment shall be arrested, or if, after judgment shall have been entered, the same shall be reversed upon any writ of error, all copies so seized shall be forthwith returned to the person or persons from whom the same shall have been so taken as aforesaid, free of all charge and expense, and without the payment of any fees whatever; and in every case in which final judgment shall be entered upon the verdict so found against the person or persons charged with having composed, printed, or published such libel, then all copies so seized shall be disposed of as the court in which such judgment shall be given shall order and direct.

III. Provided that in Scotland, in every case in which any person or persons shall be found guilty before the court of justiciary, of composing, printing, or publishing any blasphemous or seditious libel, or where sentence of fugitation shall have been pronounced against any person or persons, in consequence of their failing to appear to answer to any indictment charging them with having composed, printed, or published any such libel, then and in either of such cases, it shall and may be lawful for the said court to make an order for the seizure, carrying away, and detaining in safe custody, all copies of the libel in the possession of any such person or persons, or in the possession of any other person or persons named in such order, for his or their use, evidence upon oath having been previously given to the satisfaction of such court or judge, that a copy or copies of the said libel is or are in the possession of such other person for the use of the person against whom such verdict or judgment shall have been had as aforesaid; and every such order so made shall and may be carried into effect, in such and the same manner as any order made by the court of justiciary, or any circuit court of justiciary, may be carried into effect according to the law and practice of Scotland: provided always, that in the event of any person or persons being reponed against any such sentence of fugitation, and being thereafter acquitted, all copies so seized shall be forthwith returned to the person or persons from whom the same shall have been so taken as aforesaid; and in all other cases, the copies so seized shall be disposed of in such manner as the said court may direct.

IV. That if any person shall be legally convicted of having, after the passing of this act, composed, printed, or published any blasphemous libel or any such seditious libel as aforesaid, and shall, after being so convicted, offend a second time, and be thereof legally convicted before any commission of Oyer and Terminer or Gaol Delivery, or in his majesty's court of King's-bench, such person may, on such second conviction, be adjudged, at the discretion of the court, either to suffer such punishment as may now by law be inflicted in cases of high misdemeanors, or to be banished from the United Kingdom, and all other parts of his majesty's dominions, for such term of years as the court in which such conviction shall take place shall order.

V. That in case any person so sentenced and ordered to be banished as aforesaid, shall not depart from this United Kingdom within thirty days after the pronouncing of such sentence and order as aforesaid, for the purpose of going into such banishment as aforesaid, it shall and may be lawful to and for his majesty to convey such person to such parts out of the dominions of his said majesty, as his majesty by and with the advice of his privy council shall direct.

VI. That if any offender, who shall be so ordered by any such court as aforesaid to be banished in manner aforesaid, shall after the end of forty days from the time such sentence and order hath been pronounced, be at large within any part of the United Kingdom, or any other part of his majesty's dominions, without some lawful cause, before the expiration of the term for which such offender shall have been so ordered to be banished as aforesaid, every such offender being so at large as aforesaid, being thereof lawfully convicted, shall be transported to such place as shall be appointed by his majesty for any term not exceeding fourteen years; and such offender may be tried, either before any justices of Assize, Oyer and Terminer, Great Sessions, or Gaol Delivery, for the county, city, liberty, borough, or place where such offender shall be apprehended and taken, or where he or she was sentenced to banishment; and the clerk of assize, clerk of the peace, or other clerk or officer of the court having the custody of the records where such order of banishment shall have been made, shall, when thereunto required on his majesty's behalf, make out and give a certificate in writing, signed by him containing the effect and substance only (omitting the formal part) of every indictment and conviction of such offender, and of the order for his or her banishment, to the justices of Assize, Oyer and Terminer, Great Sessions, or Gaol Delivery, where such offender shall be indicted, for which certificate six shillings and eight pence, and no more shall be paid, and which certificate shall be sufficient proof of the conviction and order for banishment of any such offender.

The remaining clauses relate only to the mode of proceeding in case of former conviction, limitation of actions, &c.

Act 60 Geo. III. cap. ix.—*To subject certain Publications to the Duties of Stamps upon Newspapers, and to make other Regulations for restraining the abuses arising from the Publication of Blasphemous and Seditious Libels.*

First recites, that pamphlets and printed papers containing observations upon public events and occurrences, tending to excite hatred and contempt of the government and constitution of these realms as by law established, and also vilifying our holy religion, have lately been published in great numbers, and at very small prices; and it is expedient that the same should be restrained, and enacts; I. That all pamphlets and papers containing any public news, intelligence, or occurrences, or any remarks or observations thereon, or upon any matter in church or state, printed in any part of the

United Kingdom for sale, and published periodically, or in parts or numbers, at intervals not exceeding twenty-six days between the publication of any two such pamphlets or papers, parts or numbers, where any of the said pamphlets or papers, parts or numbers respectively, shall not exceed two sheets, or shall be published for sale for a less sum than sixpence, exclusive of the duty by this act imposed thereon, shall be deemed and taken to be newspapers within the true intent and meaning of several other acts of parliament now in force relating to newspapers; and be subject to such and the same duties of stamps, with such and the same allowances and discounts, as newspapers printed in Great Britain and Ireland respectively, now are subject unto under and by virtue of the said recited acts of parliament, and shall be printed, published, and distributed under and subject to all such and the like rules, regulations, restrictions, provisions, penalties, and forfeitures, as are contained in the said recited acts, or either of them.

II. That no quantity of paper less than a quantity equal to twenty-one inches in length and seventeen inches in breadth, in whatever way or form the same may be made, or may be divided into leaves, or in whatever way the same may be printed, shall be deemed or taken to be a sheet of paper within the meaning and for the purposes of this act.

III. That no cover or blank leaf, or any other leaf upon which any advertisement or other notice shall be printed, shall, for the purposes of this act, be deemed or taken to be a part of any such pamphlet, paper, part, or number aforesaid.

IV. That all pamphlets and papers containing any public news, intelligence, or occurrences, or any such remarks or observations as aforesaid, printed for sale, and published periodically, or in parts or numbers, at intervals exceeding twenty-six days between any two such pamphlets or papers, parts or numbers, and which said pamphlets, papers, parts or numbers respectively, shall not exceed two sheets, or which shall be published for sale at a less price than sixpence, shall be first published on the first day of every calendar month, or within two days before or after that day, and at no other time; and that if any person or persons shall first publish or cause to be published any such pamphlet, paper, part, or number aforesaid, on any other day or time, he or they shall forfeit for every such offence the sum of twenty pounds.

V. That upon every pamphlet or paper containing any public news, intelligence, or occurrences, or any remarks or observations thereon, or upon any matter in church or state, printed in any part of the United Kingdom for sale, and published periodically, or in parts or numbers, at intervals not exceeding twenty-six days between the publication of any two such pamphlets or papers, parts or numbers, and upon every part or number thereof, shall be printed the full price at which every such pamphlet, paper, part, or number shall be published for sale, and also the day on which the same is first published; and if any person shall publish any such pamphlet, paper, part or number, without the said price and day being printed thereon, or if any person shall at any time within two months after the day of publication printed thereon as aforesaid, sell or expose to sale any such pamphlet, paper, part, or number, or any portion or part of such pamphlet, paper, part, or number, upon which the price so printed as aforesaid shall be sixpence, or above that sum, for a less price than the sum of sixpence, every such person shall for every such offence forfeit and pay the sum of twenty pounds.

VI. Provided always, That nothing in this Act shall extend or be construed to extend to subject any person publishing any pamphlet or paper to any penalty for any allowance in price made by the person for whom and on whose behalf, and for whose profit, benefit, or advantage, the same shall have been first published, to any bookseller or distributor, or other person to whom the same shall be sold for the purpose of retailing the same.

VII. That all pamphlets and papers which are by this Act declared to be subject to the stamp duties upon newspapers, shall be freed and discharged from all the stamp duties and regulations contained in any act of parliament relating to pamphlets.

VIII. That no person, from and after thirty days after the passing of this Act, shall print or publish for sale, any newspaper, or any pamphlet or other paper containing any public news, intelligence, or occurrences, or any remarks or observations thereon, or upon any matter in church or state, which shall not exceed two sheets, or which shall be published for sale at a less price than sixpence, until he or she shall have entered into a recognizance, in the sum of three hundred pounds, if such newspaper, pamphlet, or paper shall be printed in London or within twenty miles thereof, and in the sum of two hundred pounds, if such newspaper, &c. shall be printed elsewhere in the United Kingdom, and his or her sureties in a like sum in the whole, conditioned that such printer or publisher shall pay to his majesty, his heirs and successors, every such fine or penalty as may at any time be imposed upon or adjudged against him or her, by reason of any conviction for printing or publishing any blasphemous or seditious libel, at any time after the entering into such recognizance or executing such bond; and that every person who shall print or first publish any such newspaper, pamphlet, or other paper, without having entered into such recognizance, or executed and delivered such bond with such sureties as aforesaid, shall, for every such offence, forfeit the sum of twenty pounds.

IX. If sureties pay any part of the money for which they are bound, or become bankrupt, new recognizance or bond with sureties must be given.

X. Provided sureties may withdraw from recognizance upon giving notice, and new recognizance to be entered into.

XI. Bonds not to be subject to stamp duty.

XII. Lists of recognizances and bonds taken, to be transmitted to commissioners of stamps in England, Scotland, and Ireland, respectively.

XIII. And whereas the printer or publisher of any newspaper, and of any pamphlet and paper hereby enacted to be deemed and taken to be a newspaper, will, after the passing of this Act, be bound, under and by virtue of the provisions contained in the said acts made and passed in the thirty-eighth and fifty-fifth years of his majesty's reign respectively, to deliver to the commissioners of stamps in Great Britain and Ireland respectively, or some distributor of stamps or other officer, on the day on which the same is published, or within a certain time afterwards, one of the newspapers, pamphlets, or papers so published, signed as in the said acts is respectively directed: And whereas it is expedient that the same or similar provisions and regulations should extend and be applied to all pamphlets and papers, whether published periodically or not, and which shall contain any public news, intelligence, or occurrence, or any remarks or observations thereon, or upon any matter in church or state, and which shall not exceed two sheets as aforesaid, or which shall be published for sale at a less price than sixpence; be it therefore enacted, That from and after ten days after the passing of this Act, the printer or publisher of any pamphlet or other paper for sale, containing any public news, intelligence, or occurrences, or any remarks or observations thereon, or on any matter in church or state, shall, upon every day upon which the same shall be published, or within six days after, deliver to the commissioners of stamps for Great Britain and Ireland respectively, at their head offices, or to some distributor or officer to be appointed by them to receive the same, and whom they are hereby required to appoint for that purpose, one of the pamphlets or papers so published upon each such day, signed by the printer or publisher thereof, in his hand-writing, with his name and place of abode; and the same shall be carefully kept by the said commissioners, or such distributor or officer as aforesaid, in such manner as the said commissioners shall direct; and such printer or publisher shall be entitled to demand and receive from the commissioners, or such distributor or officer, the amount of the retail price of such pamphlet or paper so delivered; and in every case in which the printer and publisher of such pamphlet or paper shall neglect to deliver one such pamphlet or paper in the manner hereinbefore directed, such printer and publisher shall, for every such neglect respectively, forfeit and lose the sum of one hundred pounds.

XIV. Provided always, That in case the said commissioners, or such distributor or officer aforesaid, shall refuse to receive or pay for any copy of such pamphlet or paper offered to be delivered to them or him as aforesaid, for or on account of the same not being within the true intent and meaning of this Act, such commissioners, distributor, or officer shall, if required so to do, give and deliver to such printer or publisher a certificate in writing, that a copy of such pamphlet or paper had been by him duly offered to be delivered; and such printer or publisher shall thereupon be freed and discharged from any penalty for not having delivered such copy as aforesaid.

XV. That if any person shall sell or expose to sale any pamphlet or other paper not being duly stamped, if required to be stamped, such person shall, for every such offence, forfeit the sum of twenty pounds.

XVI. That it shall be lawful for any of his majesty's courts of record at Westminster or Dublin, or of Great Session in Wales, or any judge thereof respectively, or for any Court of Quarter or General Sessions of the Peace, or for any justice of the peace before whom any person charged with having printed or published any blasphemous, seditious, or malicious libel, shall be brought for the purpose of giving bail upon such charge, to make it a part of the condition of the recognizance to be entered into by such person and his or her bail, that the person so charged shall be of good behaviour during the continuance of such recognizance.

XVII. Recovery of penalties. Provided always, that no larger amount in the whole than one hundred pounds shall be recoverable or recovered before any justices of the peace, for any such penalties incurred in any one day; any thing in this Act, or any other acts of parliament contained to the contrary notwithstanding.

XVIII. Two or more justices to determine offences, and may mitigate penalties.

XIX. Penalty on persons summoned as witnesses not appearing, &c.

XX to XXV. Relate to the forms of conviction, commencing actions for penalties, management of the duties, allowance of discounts, &c.

XXVI. That nothing in this Act shall extend to acts of parliament, proclamations, orders of council, forms of prayer and thanksgiving, and acts of state, ordered to be printed by his majesty, his heirs or successors, or his or their sufficient and authorised officer; or to any printed votes or other matters by order of either house of parliament; or to books commonly used in the schools of Great Britain or Ireland, or books or papers containing only matters of devotion, piety, or charity; or daily accounts; or bills of goods imported and exported; or warrants or certificates for the delivery of goods; and the weekly bills of mortality; or to papers containing any lists of prices current, or of the state of the markets, or any account of the arrival, sailing, or other circumstances relating to merchant ships or vessels; or of any other matter wholly of a commercial nature; provided such bills, lists, or accounts do not contain any other matter than what hath been usually comprised therein; or to the printers or publishers of the foregoing matters, or any or either of them.

XXVII. That nothing in this Act contained shall extend or be construed to extend to charge with stamp duties any work re-printed and re-published in parts or numbers, whether such work shall be wholly re-printed or shall be re-published in an abridged form; provided that the work so re-printed and re-published shall have been first printed and published two years at the least previous to such re-printing and re-publication, and provided the said work was not first published in parts or numbers.

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